Covering the TI99/4A EXCLUSIVELY!

MICROpendium

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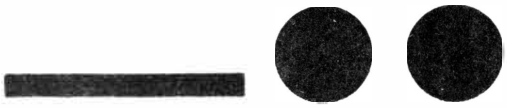

Automatic control of sprites
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Part II of computer graphics design
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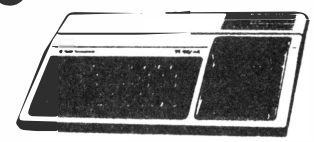

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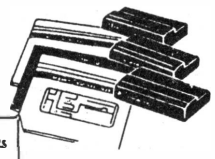

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Coming next month

—Part 3 of computer graphics design
—Mack McCormick's tutorial continues: this time he's talking about disk controllers
—John Clulow on Paolo Bagneresi's Universal GPL Loader.

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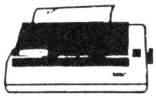

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Comments

Regena to write BASIC column

We are more than pleased with the number of readers who indicated a desire to write a BASIC column for MICROpendium. Ironically, our new columnist didn't even apply. C. Regena, who has written TI BASIC columns for the defunct 99er Magazine and more recently Compute!, will begin publishing her columns in MICROpendium. Compute! recently abandoned coverage of the TI99/4A, which is the reason Regena was available. She will make her debut in January.

We are very flattered that she agreed to write a column for MICROpendium. Most readers should be familiar with her work in the other venues and I'm sure you'll agree with us that she will make a fine addition to our stable of writers. (We can hardly wait for January to come.)

FREEWARE SURVEY IN THIS ISSUE

This issue of MICROpendium includes a survey of Freeware authors by Jim Swedlow. The article provides some hard facts on the Freeware phenomenon, and the conclusion is that most Freeware authors, if they'd known what they were getting into at the outset, would do it again. One thing not mentioned is that MICROpendium continues to publish Freeware listings. The list is now up to 10 pages and is available for $1, or fifty cents to those who send stamped, self-addressed return envelopes.

WHAT'S COMING IN 1987?

My crystal ball, being cloudy, isn't of much help but I'm predicting that 1987 may be the Year of the PC as far as the TI99/4A market is concerned. Several companies are known or rumored to be involved in the production of PEB cards or other devices designed to make TI emulate a PC using a PC DOS-type operating system. Who are they? Millers Graphics is one (Millers is expected to announce a merger in January that will be accompanied by announcements or introductions of new PC-type products for TI users.) There are also rumors about similar developments in the European market, and other domestic companies may be working in the same direction.

What does this mean for the TI user? Other than the fact that users will spend more money for PC software than TI software the question is wide open. This is new ground, folks. No one has yet taken one well-established computer system and successfully converted it into another, totally different system. While I can't think of any answers—the products haven't even been announced yet—I've got a drawer full of questions. And I'll open the drawer the day these new, mostly rumored products actually come out.

AN OPEN LETTER TO READERS

It has become harder for readers who like to flip through pages to read about the 99/4A to do so. As you know Home Computer Journal (aka 99er Magazine, Home Computer Magazine) and Compute! no longer provide such pages for the TI99/4A, but we want to let you know that we plan to print this magazine in its support for as long as you want us to. While we are appreciative of your continuing support of MICROpendium, both in terms of kind words and contributions of articles and ideas, there's one more thing you can do for us that could result in a bigger magazine. Namely, help us expand our readership. If we could add another 2,000 readers or so we could increase the amount of space we have for articles by as many as eight pages per month. (Unlike many other magazines, we do not relie on advertising as our main source of revenue. Subscription sales are our main source, because, for one thing, we keep our advertising rates low as one incentive toward the continued production of commercial products for the TI.) If you know of a TI user who previously subscribed only to Compute! or Home Computer Journal for support, let him or her know about MICROpendium. Tell them we'll send them a sample issue free of charge if they'll just send us their name or give us a call.

As far as we're concerned, the more the merrier.

—JK

Reviewed in MICROpendium

1984

February: B-1 Nuclear Bomber, Tandon TM-100 Disk Drive, Void, Beanstalk Adventure, Microsurgeon, On Gaming, Database 500
March: Star Trek, Escape From Balthazar, Garkon's Getaway, Sky Diver, Mail-Call, Prowriter 8510 Printer
April: Monthly Budget$ Master, Budget Master, Home Budget, Thief, Donkey Kong, Khe Sanh
May: Companion Word Processor, Q*Bert, Mad-Dog I & II, Programs for the TI Home Computer
June: Creative Expressions Accounts Receivable/Accounts Payable, CDC 9409 Disk Drive, Starship Concord, Lost Treasure of the Aztec, ASW Tactics II
July: Theon Raiders, Introduction to Assembly Language for the TI Home Computer, Game of Wit, Pole Position
August: TE-1200, Tower, Galactic Battle, Galaxy
September: Wycove Forth, 99/4 Auto Spell-Check, QUICKCOPYer, Wizard's Dominion, Anchor Automation Mk XII Modem
October: Killer Caterpillar, ZORK I, Defender
November: 9900 Disk Controller Card/Manager, Super Bugger, Transtar 120S printer, Floppy-Copy, Data Base-X
December: Gravity Master, Data Base Manager System, Learning 99/4A Assembly Language Programming

1985

January: Super Sketch, Foundation Computing 128K Card, PTERM-99, TI-Runner
February: Super Extended BASIC, Beginning Assembly Language for the TI, ZORK II
March: Morning Star Software CP/M Card, WDS/100 Winchester Disk Drive, Sketch Mate, BMC Color Monitor
April: 9900 Micro Expansion System, Disk + Aid, Gemini 10X-15X
May: Character Sets and Graphics Design, Draw 'N Plot
June: GRAPHX, DATA BASE I
July: Acorn 99, Advanced Diagnostics
August: Model Dow-4 Gazelle, TI-Artist, PC-KEYS, Not-Polyoptics' Bankroll
September: Midnite Mason, Myarc 32K/128K Card, GRAPHX Companion
October: 4A/TALK, Extended BASIC II Plus, XB Detective, Console Writer 2.1
November: Foundation Z80A/80-column cards, 9900BASIC, Adventure Editor
December: Display Enhancement Package, Triple Tech

1986

January: BITMAC, Starcross
February: Night Mission, Peripheral Diagnostic Module, BA-Writer
March: Super Duper, Tunnels of Doom Editor, Business Graphs 99
April: U.S. Open Tennis, PRBASE
May: 4A Flyer, GRAM Kracker, Artist's Companion
June: Myarc Disk Controller Card, Maximem
July: Horizon RAMdisk, Old Dark Caves, Funlwriter, TI99/4A Macro Assembler
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September: Mechatronic 128K card

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Feedback

Required vertical space with TI-Writer

Reader Jim Rieger wished for a required vertical space for the TI-Writer (Feedback, July 1986).

Since TI-Writer doesn't show a formatted page, once he gets a rough draft print-out of his document, he can reload the document into the text editor and use either the "NEW PAGE" command, Control 9 or Control P, to put in a required start for a new page. Or the ".BP" format command can be used to force the beginning of a new page anywhere he wants.

If he wishes to use the moving window and 80-character line in the text editor mode, he can count his lines and put in NEW PAGE or .BP without doing a rough draft of his document.

As to having this done automatically by the program, don't I wish!

Robert C. Clark
Upland, California

Make a P.E. box!

I would like to make an observation. There are hundreds of items for the TI that anyone can buy. But, if you don't have a P.E. box, you can't take the full advantage of these products. So, why doesn't someone produce a P.E. Box? The people without one could upgrade their system and buy products like the Geneve!

Bryan D. Turner
Great Bend, Kansas

TI-Writer formatting

In response to Mr. Rieger, you may include a printer pause instruction in your files, provided you print them with the FORMATTER. The mail list option will not only stop and wait for your "go ahead" but can even prompt you for the correct print wheel, colored ribbon, hardware switch, etc.

Somewhere in your document before the point where the pause is to be made, enter a "DEFINE PROMPT" command to tell yourself what to do. You should use a mail list number (less than 100) that isn't found anywhere else in your program. For example:

.DP 99: Insert Italic Wheel

Then, at the point where the pause is to be made, type *99*. When the FORMATTER sees this, it will look for a value for variable no. 99. Finding none, it will prompt you for a value using your defined prompt (if you desire) or the canned prompt contained in the FORMATTER. Change your wheel, ribbon, whatever and press ENTER to continue. Please note that if you type *99* with spaces on each side, your finished product will also contain two spaces, even if you chose the FILL option. You can correct this by typing *99* next to (or even in!) a word or phrase. For example, you could type something like:

Mary glanced at Robert and said, "*99*Are you busy this weekend?*98*"

In this example I am assuming *99* to be an intalics wheel and *98* to be the standard wheel. Note: Each "pause" *number* will work only the first time it is seen in a file! After you have pressed "ENTER" for *99*, the FORMATTER will use this value (a null string) for every other *99* in your file.

Concerning the ability to send codes 127-255: most printers must be toggled into that mode. Most RS232 units default to 7 data bits and codes 127-255 would require 8 bits. Whatever the escape sequence is to toggle the printer may be sent either in FORMATTER or the EDITOR by typing the control codes in your file. First press CONTROL U, then the appropriate key(s) as outlined on page 146 of the TI-Writer manual. To exit this "command mode," press CONTROL U again. For example, to send ESC CR you would type:

CONTROL U FUNCTION R SHIFT M CONTROL U.

Curtis Alan Provance
President, New Hampshire 99er User Group
Manchester, New Hampshire

Where credit is due...

In the July issue you published a contribution by Rick Cosmano of the SCCG entitled "Changing defaults in TI-Writer describing the procedure for substituting characters other than the @ and & for overstrike and underline.

Now in the September issue you present the same information—under the title "Fix for & and @ using TI-Writer—but credited to other sources. This is a good example of a pervasive problem in the TI user community: Group newsletters and bulletin boards derive the bulk of their information from other newsletters and/or individuals but often fail to give proper credit to their source.

In this particular case, Mr. Degner does give credit to Terry Atkinson. Since Rick Cosmano furnished his article two months earlier, I believe he should be credited with this worthwhile enhancement of TI-Writer.

A note to TI-Forth enthusiasts: The @ had long been a problem during screen-to-file and file-to-screen conversions. Fortunately, the "tick" (FUNCT-C) used by Rick is not the same "tick" (FUNCT-O) as the one in Forth. However, if you have included the backslash in your word set (to denote a comment as shown in *Forth Tools* by Anita Anderson and Martin Tracy) then I would suggest that you substitute another little-used character when incorporating these changes in TI-Writer.

Lutz Winkler
San Diego, California

Unique feature of Computer War Game

Does anyone realize that the Computer War Game has a totally unique feature? This game will go back to its title screen when the CorComp load interrupt switch is pressed.

This will work for as long as the game is in the expansion box memory. Therefore, one can play the

(Please turn to Page 10)

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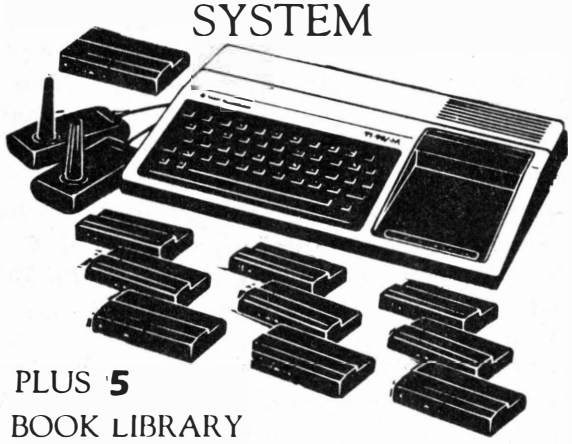

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Feedback

(Continued from Page 8)

game—then hit Function Quit—play another module-based game and then go back to Computer War instantly by pressing the load interrupt switch. This also works for Submarine Commander and River Rescue.

Wouldn't it be great to have a disk-based Disk Manager capable of being restarted so easily without reloading?

As for Mr. [John] Dow's flight simulator, sure, I would be interested in purchasing it. But I very seriously doubt that I'll ever see it released unless someone beats him and he's forced to release it as Freeware. Just sounds to me like he wants to have only one release, which is perfect, instead of doing what other authors do—release Release 1, then Release 2, 3 etc. Perhaps he should consider doing as others have and are doing, allowing you to exchange your old release for the new release.

Of course he could do this if he ever thought he would put any more time into the product. However, I believe that we will never see this one and that we will instead end up with 10 top quality flight simulators just like we ended up with 10+ graphics creation packages.

Does anyone know if Myarc ever made the 512K card compatible with the CorComp RS232 card for spooling purposes?

I just got the Myarc disk controller card and it is absolutely great. Their disk based Disk Manager is indeed supreme. I've tried a lot of disk based disk managers before and always ended up back using the Disk Manager II cartridge simply because of its ease of use. Now I do use the supreme Disk Manager.

The Call Directory command also is a godsend for those of us who just haven't totally catalogued all of our disks with a master list and labeled them properly.

Isn't it time that we skip an issue to catch up to the month that your magazine should come out? Why continue to be sloppy with the issue date?

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Joe Constance
Pittsburgh, Pennsylvania

Lou Phillips of Myarc says the Myarc 512K card will not work with the parallel port of the CorComp RS232 because of "architectural differences."

The changes in procedure and techniques required for a double issue would probably throw us off even further.—Ed.

Memory expansion card query

There has recently been quite a lot of fanfare over memory expansion cards, even a number of reviews. I find that in all such reviews, however, little is ever said of the usable CPU memory; rather, all discussion turns toward RAMdisk and spooling functions. Is this all these cards can do?

Are Extended BASIC and Multiplan and TI-Writer able to take advantage of these cards, or are they limited to 32K of CPU memory?

With the advent of several "cartridge to disk" hardware/software systems, is it reasonable to assume that one could with very little programming modify a program which has been dumped to disk so that it could utilize a full 512K of CPU memory?

I would very much appreciate a discussion on these memory expansion cards from the standpoint of CPU memory expansion. In this discussion it would seem reasonable to include Geneve. Is it truly a 640K machine expandable to 1MEG, or is its capability based only on totally new software without hopes of using existing TI software to take advantage of this memory?

Gerald L. Katrana
Aurora, Colorado

RAMdisk memory has nothing to do with the Central Processing Unit (CPU). A RAMdisk is analogous to a floppy disk in that it is a respository for data (programs and files). As such, a user may write a file created by a program such as Multiplan to the RAMdisk. The principal advantage of a RAMdisk over a floppy is its much faster access time on input/output operations. Also, a battery backed RAMdisk is capable of retaining programs and files even when the computer is turned off.

Since the CPU of the TI is not expandable per se, the modifications you suggest for TI-Writer, etc. would not be possible, though if a larger CPU were available I am sure a number of talented programmers would be able to take advantage of it.—Ed.

Easiest BBS?

In the August issue letters column there was a man who wanted to know of an easy BBS to hook up. Well, my BBS System is the easiest BBS to hook up. It uses standard TI modem cable with a one pin modificiation. Pin 8, the carrier detect lead, must be connected to pin 19 on the RS232. This tells the software that the person has hung up.

Nick Iacovelli Jr.
Melrose Park, Illinois

The Feedback column is for readers. It is a forum to communicate with other readers. The editor will condense excessively lengthy submissions where necessary. We ask that writers restrict themselves to one subject for the sake of simplicity. Our only requirement is that items be of interest to persons who use the TI99/4A home computer. Mail Feedback items to: MICROpendium, P.O. Box 1343, Round Rock, TX 78680.

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Part II in a series on computer graphics

Two-dimensional transformations

You don't have to be a physicist

By DARREN LEONARD

First, two errors in my first article (June 1986) have been brought to my attention.

The corrections are:

Subprogram circle on page 20 should include the line

155 CALL PUTDOT(X,Y)

Subprogram putdot's line 507 should have read

507 IF A<>32 THEN C=C+1 ELSE A=C:: IF C<34 THEN 531

Now that we have taken care of the past it is time to move on. As promised, I will begin two-dimensional transformations in this article, but I would like to cover another useful application of the PUTDOT subroutine.

If you have had any physics or post-algebra mathematics, you are probably aware that there is an equation to describe just about anything. An equation describes the motion of the earth around the sun. An equation (albeit a long one) was used to plot the motion of the astronauts on their way to the moon. An equation can be used to determine the path (trajectory) of a bullet (projectile).

You don't have to be a theoretical physicist to appreciate the usefulness of such equations, nor need you be more than five years old to realize that the digital computer is the ideal tool to utilize these equations.

Don't let what I am about to do intimidate you. You needn't know any physics to learn something here. All you need is the will to learn.

Let's take a closer look at the bullet being fired out of a gun. Assume there is no air resistance and that no other forces influence the projectile except gravity. The weight and shape of the projectile are immaterial.

Let's say we know three things about the situation of the muzzle of the gun:

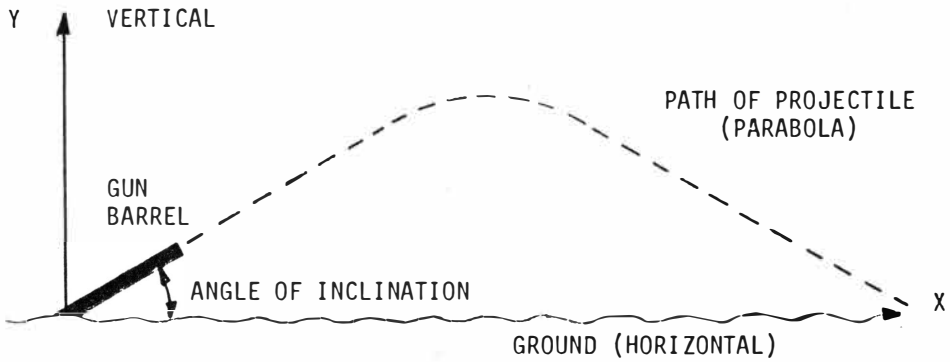


Fig. 1 SKETCH OF BALLISTIC PROBLEM

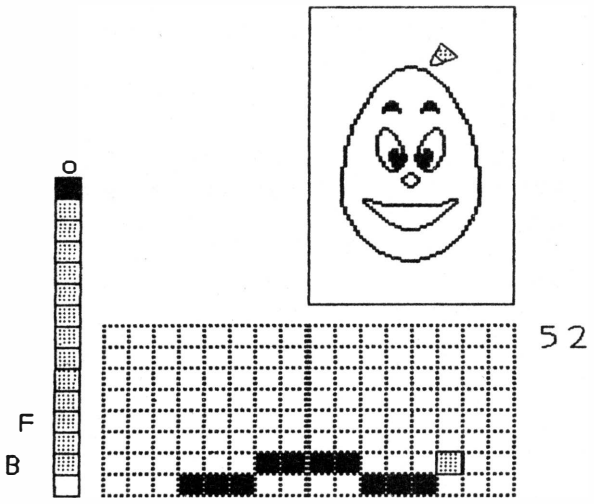
1) The velocity of the bullet as it exits the barrel. Since there is no air resistance (i.e. hypothetical situation), the velocity will remain constant for the entire time. Units bear no direct consequence in this example so you may use miles per hour, meters per second, or, if you wish, furlongs per fortnight. However, if you are interested in comparisons of the flight path of two projectiles that differ only in angle of inclination from the horizontal or in velocity, you should be consistent. We will use the variable V to indicate velocity.

2) The angle of inclination from the

(Please turn to Page 14)

```
100 REM PATH OF PROJECTILE
110 REM DARREN LEONARD 11/83
120 REM PUTDOT SUBROUTINE MUST BE APPENDED
130 REM IN ORDER FOR THIS TO WORK
140 REM
150 PRINT "ENTER THE VELOCITY OF BULLET"
160 INPUT V
170 PRINT "ENTER ANGLE OF INCLINATION OF THE"
180 PRINT "MUZZLE FROM THE HORIZONTAL IN"
190 PRINT "DEGREES"
200 INPUT Z
210 Z=Z*(PI/180)!CONVERT DEGREES TO RADIANS
220 PRINT "ENTER TIME INCREMENT IN SECONDS"
230 INPUT DT :: CALL CLEAR
240 T=0
250 X=INT(V*COS(Z)*T-100)!DETERMINE HORIZONTAL DISTANCE
260 Y=INT(V*SIN(Z)*T-(1/2)*32.2*T*T)-45 !DETERMINE VERTICAL DISTANCE
270 IF Y=0 AND T=0 THEN 150 !STOP WHEN BULLET HITS GROUND
280 CALL PUTDOT(X,Y)!PLOT POSITION AT THIS INSTANT
290 T=T+DT :: GOTO 250
300 END
```

CHARAMAT is a graphics development tool for Extended Basic programmers. It consists of an editor and 16 support routines all written in assembly language. The editor performs the following four functions at the same time:



* Allows you to draw smoothly within a rectangular window, in which 8 times 14 characters of Extended Basic are shown without spaces in between. In other words, you draw an instance of size 64 times 112 pixels.
* Displays the current character being drawn, magnified by a factor of 8. The left adjacent character is also displayed.
* Shows the ASCII code of the current character.
* Shows the colors of the current character. Colors can also be changed with the editor.

The editor has many additional features. It can, for instance, be used in debugging an Extended Basic program. - The 16 support routines allow use of the computer's memory for the storage of graphics data and perform data transfer to disk with assembly language speed. They open a new dimension to programmers interested in print graphics or screen animation. - The editor is easy to use and makes short work out of creating Extended Basic graphics.

$39.90 Requires 99/4A, TI Extended Basic, 32K, disk.

PRINT DESIGNER allows full use of the graphics capabilities of the Micronics S6-10 and NX-10 printers. It prints in three modes (compare the flower designs):

(1) single density
(2) double density horizontally and vertically
(3) quadruple density horizontally and double density vertically

Pictures are first drawn for print modes (1) and (2). Next a special routine can be used to double every pixel horizontally and make the picture ready for print in mode (3). The design can then be refined anywhere you want. A picture may have up to 1920 pixels horizontally and is limited vertically only by what fits on a disk. Use with GRAPHX, TI-Artist or our own graphics design program, BIGCHAR, which is included. Produce fancy letterheads and labels, fill the Christmas and New Year days creating a full page picture, or just print your GRAPHX or TI-Artist screens in double density format.

$29.90 Requires 99/4A, TI Extended Basic, 32K, disk, S6-10 or NX-10.
Two disk drives are required for use with GRAPHX or TI-Artist.

This ad was all made with PRINT DESIGNER and an NX-10 (using Basic for the text).

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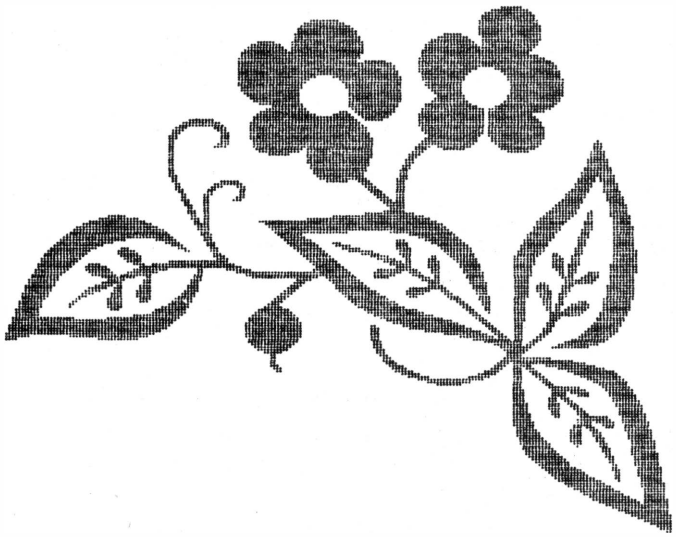

TWO-DIMENSIONAL TRANSFORMATIONS—

(Continued from Page 12)

horizontal of the muzzle. We will refer to this angle as Z. (See Fig. 1.)

3) That the path of a projectile as a function of time, velocity and initial angle can be determined by the equations:
X = V*COS(Z)*T where T is time and X is horizontal distance.
X = V*SIN(Z)*T-(1/2)*32.2*T² where Y is vertical distance, T is time and 32.2 is the gravitational constant. (Before you engineers and physicists out there begin forming a lynch mob, I realize that I have made a lot of assumptions and have idealized the situation quite a bit, but I feel that it will illustrate the usefulness of computer graphics for other than video games.)

We are now prepared to write our program. (If you are clueless, just enter the program, run it and forget Newton.)

I would like to point out a few things that may help here.

The greater the velocity, the straighter the path. The smaller the time increments, the smoother the path. Because of the limited resolution of the 99/4A, you will have to test different values of time increments to come up with the smoothest curve possible.

If you get an error, try different values at the input. The angle should be between 0 and 90 degrees. Try different values and prove to yourself that a bullet will travel the greatest distance if it is shot at 45 degrees from horizontal.

I will leave it as a thought exercise for you to determine the initial conditions. Stop and think for a few minutes and impress yourself with what you know about the world around you. Incidentally, don't hesitate to use time increments of .1 or .01 seconds; any positive time increment is legal. Don't use negative increments unless you have discovered a method of reversing time. (If you have, you are wasting your time reading this.) Enough said.

(Try these starting values: Velocity = 75; Angle in degrees = 45; Time increment = .10—Ed.)

2-DIMENSIONAL TRANSFORMATIONS

One of the great misfortunes of mathematics is that in order to do something on the top of the pyramid, you must learn what is on the bottom first, and CAD is no different.

Now I will introduce you to some simple matrix (array) transformations. It is the matrix that allows us to rotate a square (or cube) and I will show the method of doing this once the array is covered.

After this introduction to the array, you should have a good understanding of what an array is and what you can do with it. Though it may seem a drag right now, it may benefit you in future programming. It is not absolutely necessary that you fully comprehend all this in detail to utilize the program, but if you have some idea of what is going on, you are apt to get more out of this article.

From experience, I have found that mathematicans use the term "matrix" and computer enthusiasts use "array." Since they are pretty much the same, I will use the terms interchangeably.

A variable is a character that is used to represent a value.

For example, A = 69 means that A has the same value as 69 so if you have a line in your program that looks like this:
130 LET A = 69
you may use either A or 69 in your program to work with the value of 69. This being the case:
A + 1 = 70 and 69 + 1 = 70

The ability to use this type of variable this type of variable is useful to a point, but if you are working with lots of numbers, you will soon realize that it is severely limited. Therefore, we bring into play the subscripted variable.

If you have been working with TI BASIC, you are aware that you can use numbers in your variable names. Thus, A1, A2, A3, B9 and C8I are all legal variables. This is fine for simple applications, but suppose you wanted to be able to access the values of A1, A2 etc. in quick succession so you could sort them. If we introduce subscripting, we have efficiently solved our problem.

Let's say that
A(1) = A1
A(2) = A2
A(3) = A3...

If you look in your manual, you will notice that it is allowable to use a variable within the parentheses to indicate which element of the subscripted variable we want. Therefore A(J), if J = 2, will have the same value as A(2) or A2. Since J is a variable, it can be incremented, looped, decremented and manipulated to suit your need.

With J (or any other variable used for this purpose) being operated on by the program, the computer is easily able to process sizable amounts of data. A() is called many different things, but the terms you are most likely to hear include one-dimensional array, vector array and possibly linear array.

Now suppose that we have the numbers in the array A() written on page one of a book. Also suppose that we have several numbers written on page two of that same book. Let's say we want to sort the numbers on each page but we wish to keep the two pages separate.

One way of doing this would be to have two vector arrays and operate on each one individually.

A( ) contains the information on page one of the book.

B( ) contains the information on page two of the book.

This would work for this situation, but would be cumbersome in more cumbersome applications. If we remember that A() is 1 and B() is 2 we can set up a two-dimensional array to include both pages of data. Say there are 20 numbers on each page to be sorted. If we set up an array of size C(2,20) and use the variables K and J to subscript the array such that it is ac-

(Please turn to Page 16)

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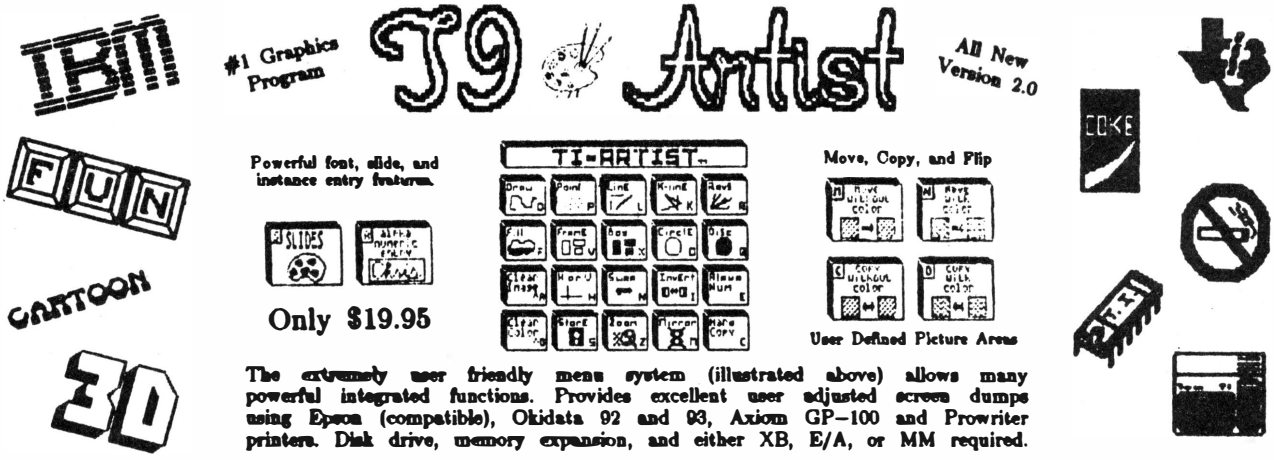

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TWO-DIMENSONAL TRANSFORMATIONS—

(Continued from Page 14)

cessed as C(K,J) when L amd K have values, K indicates which page and J indicates which element.

This being the case

C(1,3) = A(3) = A3

C(2,5) = B(5) = *B5*

C(1,J) = A(J) regardless of the value of J

C(2,J) = B(J) regardless of the value of J

Just for the sake of it, let us say that we have a second book with two pages of information on it. In book 2 the information could be stored for the first page in array D() and the second page in array E(), or both could be stored in a similar method as above in the 2-D array F(,). This would give us two separate 2-D arrays to handle to work with our data.

Array C(,) has the information in book one.

Array F(,) has the information in book two.

This is workable, but it is not very convenient if you are switching books a lot. Here comes the three-dimensional array. (We are not going beyond 3-D.) We will use the matrix G(2,2,20) to store our data. We will use the subscripted notation of G(L,K,J) to identify which book, page and element we want to read. Thus, L is book number, K is page number and J is still element number. With this in mind, let's examine a few samples:

G(1,1,1) = A(1) = A1 = C(1,1)

G(1,2,4) = B(4) = C(2,4)

G(2,2,8) = E(8) = F(2,8)

G(2,1,7) = D(7) = F(1,7)

Simple, right?

Here is where the real fun starts. Suppose we have to multiply one matrix with another matrix. There is a specific order in which this occurs. Listed below is the subprogram that will multiply a matrix A(N.N) and B(N.N) and produces matrix C(N.N).

Comments about this subroutine:

The arrays A, B and C must be dimensioned in the main program.

The numerical values of the elements of A and B must be entered in the main program. Thus, when you gosub to the subroutine you will have two full arrays and one empty one. the resulting matrix will be in C.

I strongly recommend that you get a piece of paper and follow, step by step, what the subroutine is doing.

In order to preserve your sanity, we have provided examples. See Figs. 2 and 3.

Fig. 2 Matrix A

3	5	1	9
1	7	2	8
4	1	3	9
4	0	7	7

Matrix B

2	1	7	3
1	5	1	0
6	5	5	1
8	0	6	3

```
100 REM MULTIMATRIX (TO BE USED AS A SUBROUTINE)
110 REM DARREN LEONARD 9/86
120 REM ARRAY C(N,N) MUST BE DIMENSIONED IN MAIN PROGRAM
130 FOR I=1 TO 4
140 FOR J=1 TO 4
150 SUM=0 !TEMPORARY VARIABLE
160 FOR K=1 TO 4
170 SUM=SUM+A(1,K)*B(K,J)! MULTIPLY EACH ROW OF A BY EACH
180 NEXT K !COLUMN OF B TO DETERMINE C
190 C(I,J)=SUM
200 NEXT J
210 NEXT I
220 RETURN !MUST BE CALLED FROM A GOSUB COMMAND
```

Now, you must multiply the first row of A by the first column of B to determine the first element of C

A(1,1)*B(1,1) + A(1,2)*B(2,1) + *A(1,3)*B(3,1) + A(1,4)*B(4,1)* = C(1,1)

thus

3*2 + 5*1 + 1*6 + 9*8 = C(1,1)

6 + 5 + 6 + 72 = 89 and this means that C(1,1) = 89

C(1,2) is obtained by multiplying the first row of A by the second column of B.

C(3,4) is determined by multiplying the third row of A by the fourth column of B, and so on.

The first subscript is the row of A and the second subscript is the column of B. Got it? If not, look at the chapter on matrices in any algebra or calculus book.

If A is multiplied by B, then the matrix C should look like this. (Check it with your results to see whether you are following this.)

Fig. 3 Matrix C

89	33	85	37
85	46	72	29
99	24	98	42
106	39	105	40

Now that we have a feel for matrices and multiplication of them, we are ready to proceed into the applications to graphics.

In order to do complicated graphic transformations, we must enter our datapoints (screen coordinates of what is to be plotted) into a matrix form.

(Please turn to Page 18)

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Who:

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TWO-DIMENSIONAL TRANSFORMATIONS—

(Continued from Page 16)

Once we have our data in a matrix, we will multiply it by another matrix to determine the new screen coordinates for the altered shape. The matrix that we multiply our data array by will depend on whether we want to rotate, scale or transform it.

Very simply, rotating is changing the orientation of the shape about a certain point, scaling is changing the size of the shape and translating is moving the shape to a different screen location.

Let's use a simple array A(2) such that A(1)=X and A(2)=Y, i.e., the original coordinates are in matrix A and will be altered. The altered coordinates will be designated with a prime. In other words, X' is the new X coordinate and Y' is the new Y coordinate.

With this in mind, let's proceed to scaling.

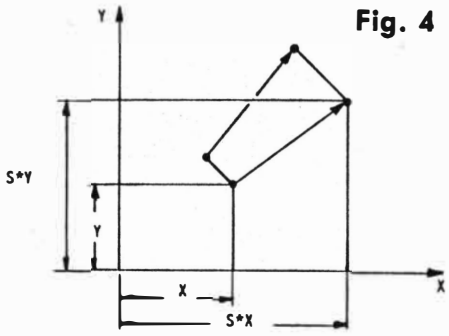
SCALING

The size of an image can be increased or decreased by means of a scaling transformation,

X'=S*X and Y'=S*Y

Graphically, scaling is shown in Fig. 4.

Fig. 4



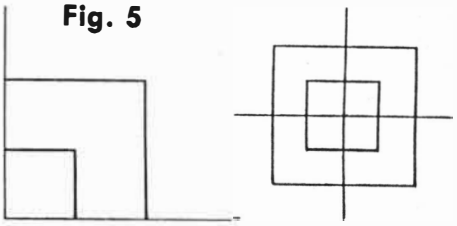
This transformation is represented in matrix form as

$$\begin{pmatrix} X' \\ Y' \end{pmatrix} = \begin{bmatrix} S & 0 \\ 0 & S \end{bmatrix} X \begin{pmatrix} X \\ Y \end{pmatrix}$$

If this transformation is applied to each point defining an image, the entire image will be scaled (up or down). The effect of this scaling transformation is dependent on the numerical value of S. If S is unity (one) then there will be no change in the size. If S is less than one, the size will decrease and if S is larger than one, the size will increase.

The further S is from 1, the more profound the change in size will be. For example, a scale factor S of .3 will produce a smaller shape than a scale factor of .6

Fig. 5



The effects of scaling depend on the location of the image with respect to the coordinate system. (See Fig. 5.) In

(Please turn to Page 20)

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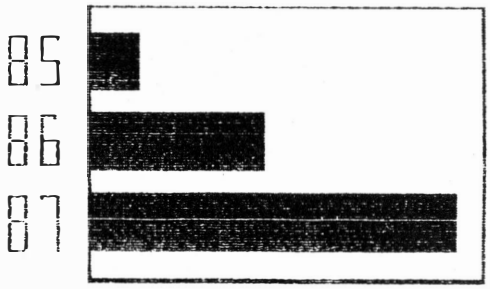

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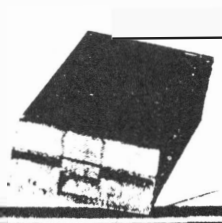

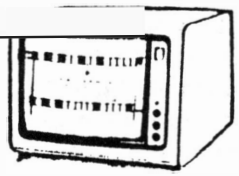

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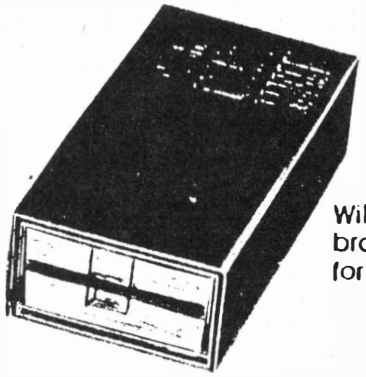

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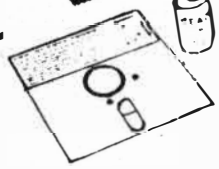

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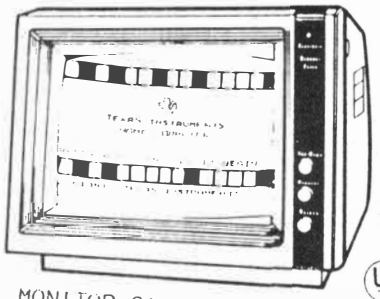

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TWO-DIMENSIONAL TRANSFORMATIONS—

(Continued from Page 18)

the form on the left the coordinate system origin is at the lower left corner and the scaling enlarges the image and also translates its center.

In the figure on the right, the coordinate system origin is also the geometric center of the image. The image is simply expanded because the positive coordinates and negative coordinates become more negative. Thus, rescaling of images after they have been displayed should be done with reference to their geometric centers to avoid unwanted translations.

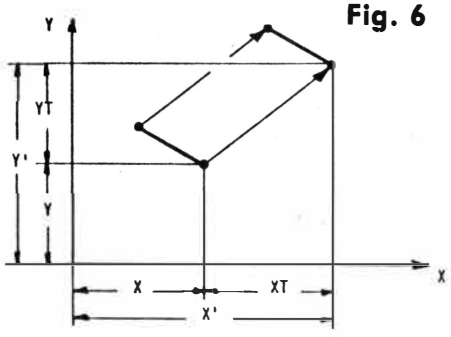
If you are the type who likes to figure things out himself, you should now be able to scale an object. If you are not sure, read on about translation and we will give you some examples to help clarify things.

TRANSLATION

One of the simpler transformations available in computer graphics is translation, or movement of the image to another location on the screen. During translation, no rotation or change in size occurs. Any point (X,Y) at the end of a line segment can be moved to another location (X',Y') by translating it through a distance XT in the X-direction and YT in the Y-direction. That is $X' = X + XT$ and $Y' = Y + YT$

If the same translation is applied to the point at the other end of the line segment, then the entire segment will be translated the same distance without a change in size or orientation as in Fig. 6.

Fig. 6



The translation equations above can be represented in matrix form if we consider that the original coordinates (X,Y) as a 2x1 matrix (column vector) operated on by a 2x3 transformation matrix to give the transformed coordinates (X', Y') as a column vector.

This just means:

$$\begin{pmatrix} X' \\ Y' \end{pmatrix} = \begin{bmatrix} 1 & 0 & XT \\ 0 & 1 & YT \end{bmatrix} * \begin{pmatrix} X \\ Y \\ 1 \end{pmatrix}$$

Remember what we learned about multiplying matrices and see that
$X' = 1*X + 0*Y + 1*XT$ which is equal to $X + XT$
$Y' = 0*X + 1*Y + 1*YT$ which is equal to $Y + T$

If you are wondering why it is necessary to use matrices to do this when all you need to do is add XT or YT to each point just before you plot it, consider what happens when you have several hundred points to plot. You would have to write pages of a program to accomplish what a matrix with loops can do.

At this point you know now all you need to know to plot an image and translate and scale it. However, all these bits and pieces of knowledge are nearly useless unless they can be integrated into one coherent program.

If you have time, I urge you to try to piece together all the material from these two articles and plot a square and scale it and move it about the screen.

The best way to learn something is to figure it out yourself once you have been provided with the preliminaries. I will provide you with a program that will incorporate everything to date in the next article. I will also go into rotating shapes in 2D in the same article.

A few closing words that might help.

The TI99/4A has very limited resolution. Keep this in mind when your image looks distorted. This is an intrinsic limitation of the machine and little can be done about it.

If errors or problems are occurring, make sure you are not trying to plot outside the screen. In general, it is best to work with a shape that is about ⅓

(Please turn to Page 22)

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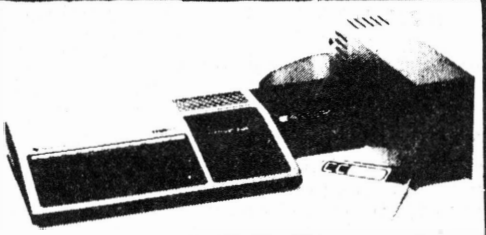

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Automatic Sprite Control

'Attach' a sprite to a joystick

By J. PETER HODDIE

One of the most powerful capabilities of the 4A is the ability to set a sprite in motion and have it continue its motion while the program continues to execute other code. This relieves the program of the time-consuming task of moving the sprite itself. This is one of the many "set it and forget it" features that TI built into the 4A.

The routines presented in this article carry that idea one step further by allowing a sprite to be more or less "attached" to a joystick so that the sprite is under joystick control while the program is executing other code. This means that the program doesn't need to have any code to control the motion of the user's sprite. You assign control of sprite No. 1 to joystick No. 1, and sprite No. 2 to joystick No. 2. You control the speed of the sprite, and how often the joystick is checked (up to 60 times a second!). There are also routines that tell whether the fire button has been pressed.

All of this is accomplished through the use of the user-defined interrupt routine pointed to by address 83C4. Fast scanning of the joystick is handled by checking the CRU bits directly, as documented in Miller Graphics' excellent Explorer manual. Handling the joystick scanning this way means that these routines won't work on a 99/4 or Geneve. It also means that the Q and Y keys will not be interpreted as fire but-

(Please turn to Page 24)

```
       DEF  JOYSET
       DEF  FIRED1,FIRED2

NUMASG EQU  >2008          ASSIGN FLOATING POINT NUMBER TO VARIABLE
NUMREF EQU  >200C          GET FLOATING POINT NUMBER FROM VARIABLE
XMLLNK EQU  >2018          LINK TO ROM ROUTINE
CFI    EQU  >12B8          CONVERT FLOATER TO INTEGER DATA FOR XMLLNK
FAC    EQU  >834A          ADDRESS OF THE FLOATING POINT ACCUMULATOR
GPLWS  EQU  >83E0          GPL WORKSPACE ADDRESS

VDPWA  EQU  >8C02          SET VDP WRITE ADDRESS
VDPWD  EQU  >8C00          VDP WRITE DATA ADDRESS

RADIX1 DATA >4001,0,0,0    A FLOATING POINT 1
RADIX0 DATA >0000,0,0,0    A FLOATING POINT 0

H01    DATA 1              A "1"
H02    DATA 2              A "2"

WS     BSS  32             MY WORKSPACE REGISTERS

OFTEN  BSS  2              HOLD FOR HOW "OFTEN" INTERRUPT ROUTINE IS EXECUTED
COUNT  BSS  2              COUNT DOWN TIMER FOR INTERRUPT

HOR    BSS  2              HORIZONTAL ACCUMULATOR
VER    BSS  2              VERTICAL ACCUMULATOR
FIRE1  BSS  2              FIRE BUTTON #1 STATUS
FIRE2  BSS  2              FIRE BUTTON #2 STATUS

SPD    BSS  2              SPEED
SPDN   BSS  2              NEGATIVE OF SPEED, EH?

MODE   BSS  2              CURRENT MODE SELECTED

************************

JOYSET
       LIMI 0              TURN INTERRUPTS OFF, JUST IN CASE
       LWPI WS             LOAD IN MY WORKSPACE

       LI   R0,INTER       ADDRESS OF _MY_ INTERRUPT ROUTINE
       MOV  R0,@>83C4      GIVE IT TO THE "USER DEFINED" INTERRUPT

       CLR  @FIRE1         CLEAR THE FIRE BUTTON #1 COUNTER
       CLR  @FIRE2         CLEAR THE FIRE BUTTON #2 COUNTER

       CLR  R0             ARRAY ELEMENT ZERO
       LI   R1,1           FIRST ELEMENT IN LINK LIST
       BLWP @NUMREF        GET THE FLOATING POINT NUMBER
       BLWP @XMLLNK        LINK TO ROM ROUTINE TO . .  ..
       DATA CFI             CONVERT FLOATING POINT TO INTEGER
       MOV  @FAC,@MODE     GET THE INTEGER AND COMPARE TO ZERO
       JNE  JOYSE1         IF NOT ZERO GO ON AHEAD
       CLR  @>83C4         IT WAS ZERO. TURN "USER DEFINED" INTERRUPT OFF.
       JMP  JOYSE2         AND RETURN TO BASIC

JOYSE1 CLR  R0             ARRAY ELEMENT ZERO
       LI   R1,2           SECOND ELEMENT IN THE LINK LIST
       BLWP @NUMREF        GET THE FLOATING POINT NUMBER
       BLWP @XMLLNK        LINK TO ROM ROUTINE TO . . .
       DATA CFI             CONVERT FLOATER TO INTEGER
       MOV  @FAC,R1        MOVE SPEED INTO R1
       MOV  R1,@SPD        MOVE SPEED INTO "SPD"
       NEG  R1             GET NEGATIVE OF SPEED
       MOV  R1,@SPDN       MOVE NEGATIVE OF SPEED INTO "SPDN"

       CLR  R0             ARRAY ELEMENT ZERO
       LI   R1,3           THIRD ELEMENT IN THE LINK LIST
       BLWP @NUMREF        GET THE FLOATING POINT NUMBER
       BLWP @XMLLNK        LINK TO ROM ROUTINE TO . . .
```

(Please turn to Page 24)

TRANSFORM—

(Continued from Page 20)

the number of pixels available in a direction, i.e., an ideal square would measure about 70x70 pixels across.

Pay attention to what you are using for the coordinate origin!

If you are hopelessly lost, stay tuned for the next article, which should put you in the driver's seat.

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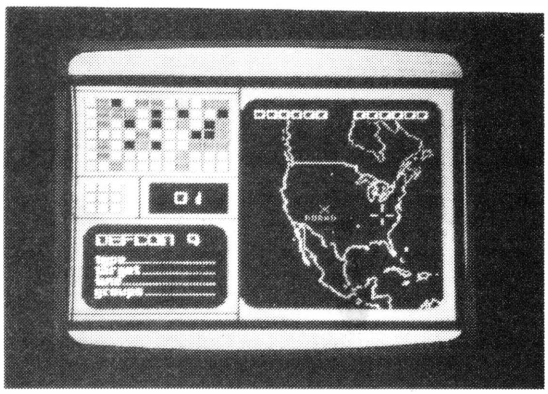

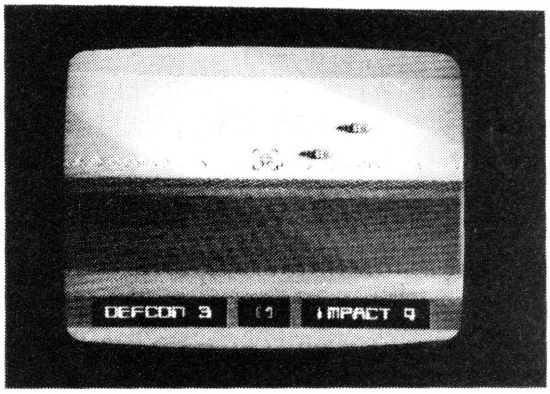

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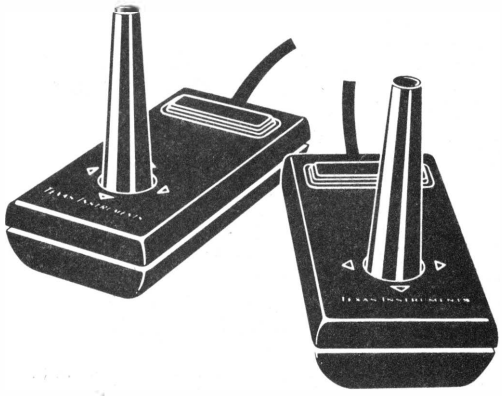

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SPRITE—

(Continued from Page 22)

ton presses. The ALPHA lock must still be up to enable upward motion.

To use these routines type in the assembly source code listing, assemble it using only the "R" option, and then load it into Extended BASIC by typing:

CALL INIT

CALL LOAD("DSKn.filename")

Because these routines use the interrupts they may not work correctly with other assembly routines that also use interrupts.

The main routine is JOYSET. It is called as follows:

CALL LINK("JOYSET",MODE,SPEED,OFTEN)

The mode is a value from 0 to 3 and is as follows:

0 turn off the interrupt routine

1 control sprite No. 1 with joystick No. 1

2 control sprite No. 2 with joystick No. 2

3 numbers 1 and 2 above combined

The speed is a number between 1 and 127 indicating how fast the sprite will move. This value is the same as used in Extended BASIC's CALL SPRITE statement.

OFTEN indicates how often the interrupt routine that moves the sprite should be executed. It must be greater than zero. A value of 1 indicates that the joystick will be checked every 60th of a second. A value of 2 will check every second 60th of a second, 3 every third 60th, and so on. The lower the number, the greater the degree of control the user will have over the sprite. However, greater control also means that the Extended BASIC program will run somewhat slower.

There are two routines that tell whether the fire button has been pressed since the last time either JOYSET or the FIRE routine was called. This means that a press of the fire button will not be missed because the FIRE

(Please turn to Page 26)

JOYSET

(Continued from Page 22)

```
       DATA CFI             CONVERT FLOATER TO INTEGER
       MOV  @FAC,@OFTEN     MOVE THAT NUMBER TO THE HOW "OFTEN" VARIABLE
       MOV  @FAC,@COUNT     AND ALSO INITIALIZE THE COUNT DOWN "COUNT"

JOYSE2
       LWPI GPLWS           LOAD BACK THE GPL REGISTERS
       B    @>006A          AND RETURN TO XBASIC

************************

FIRED1
       LWPI WS              LOAD MY WORKSPACE
       LI   R5,FIRE1        MAKE R5 POINT TO FIRE BUTTON #1 COUNT
       JMP  FIRE            JUMP TO MAIN FIRE ROUTINE

FIRED2
       LWPI WS              LOAD MY WORKSPACE
       LI   R5,FIRE2        MAKE R5 POINT TO FIRE BUTTON #2 COUNT

FIRE
       MOV  *R5,R6          GET THE FIRE BUTTON COUNT
       CLR  *R5              AND CLEAR THE FIRE BUTTON COUNT

       LI   R3,RADIX1       MAKE R3 POINT TO A FLOATING POINT "1"
       MOV  R6,R6           IS FIRE BUTTON COUNT ZERO?
       JNE  FIREA           NOPE. SO SENDING BACK A "1" IS CORRECT. SO SKIP AHEAD
       LI   R3,RADIX0       MAKE R3 POINT TO A FLOATING POINT "0"

FIREA
       LI   R7,FAC          R7 POINTS TO THE "FLOATING POINT ACCUMULATOR"
       LI   R8,4            WE HAVE 4 "WORDS" TO MOVE

FIREB  MOV  *R3+,*R7+       MOVE A WORD AND INCREMENT BY TWO BOTH POINTERS
       DEC  R8              DECREMENT WORD COUNTER
       JNE  FIREB           IF NOT DONE . . KEEP ON MOVING

       CLR  R0              ARRAY ELEMENT ZERO
       LI   R1,1            FIRST ELEMENT IN LINK LIST
       BLWP @NUMASG         ASSIGN THE NUMBER

       JMP  JOYSE2          RETURN TO BASIC

************************
* THIS IS THE INTERRUPT ROUTINE

INTER  LIMI 0               TURN OFF THE INTERRUPTS OR EVERYTHING WILL BLOW UP!

       DEC  @COUNT          DECREMENT THE COUNTER
       JNE  INTBYE          IF NOT ZERO THEN RETURN
       MOV  @OFTEN,@COUNT OTHERWISE RE-INITIALIZE THE COUNTER

       LWPI WS              LOAD IN MY WORKSPACE

       MOVB @-31878,R0      GET NUMBER OF SPRITES IN MOTION
       SRL  R0,8            MAKE IT A WORD
       CI   R0,2            COMPARE IT TO "2"
       JGT  INTER0          IF MORE THAN TWO SPRITES IN MOTION . . SKIP AHEAD
       LI   R0,>0200        GET A TWO TO . . .
       MOVB R0,@-31878       FORCE TWO SPRITES TO BE IN MOTION

INTER0 C    @MODE,@H02      COMPARE THE MODE TO 2
       JEQ  INT1            IF MODE IS TWO . . DON'T DEAL WITH JOYSTICK #1

       CLR  R10             OFFSET INTO SPRITE MOTION TABLE
       LI   R1,>0600        JOYSTICK #1 CRU ADDRESS
       BL   @INTSUB         SCAN JOYSTICK

INT1   C    @MODE,@H01      COMPARE THE MODE TO  1
       JEQ  INT2            IF MODE IS ONE THEN DON'T DEAL WITH JOYSTICK #2

       LI   R10,4           OFFSET INTO SPRITE MOTION TABLE
       LI   R1,>0700        JOYSTICK #2 CRU ADDRESS
       BL   @INTSUB         SCAN JOYSTICK
```

(Please turn to Page 26)

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If unknown, contact MYARC (201) 766-1700 for dealer information.

SPRITE—

(Continued from Page 24)

routine was not called exactly when the button is down. The routines are called FIRE1 and FIRE2 for joystick 1 and 2, respectively. They are called by:

CALL LINK("FIRE1",F)
CALL LINK("FIRE2",F)

F will equal 0 if that fire button has not been pressed and 1 if it has.

The first program listing is a very primitive drawing program. Use the fire button to clear the screen. The second program is a simple game. The object is to collect the numbers from 1 to 4 in order while avoiding the drifting ships. Collect a number by moving the ship (starts at the top) over the number and press the fire button. These programs illustrate various simple uses of these routines. I am very interested in seeing what others can accomplish with these routines.

In a future article I will provide a set of routines for doing automatic coincidence checking as these routines do automatic sprite/joystick control.

The source code, object code, and demonstration program may be downloaded from BCS TI99 BBS No. 2 at (617)335-8475 operating 24 hours a day at 300/1200 baud with TE2 and Xmodem transfers. To obtain the files on disk send $3 to: Boston Computer Society; TI99 User Group; ATTN: J. Peter Hoddie; One Center Plaza; Boston, MA 02108.

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JOYSET

(Continued from Page 24)

```
INT2
       LWPI GPLWS          LOAD BACK THE GPL REGISTERS
INTBYE RT                  RETURN FROM INTERRUPT ROUTINE


*************************

INTSUB

       MOV  R1,R5          MAKE A COPY OF R1 FOR LATER USE
       LI   R12,>0024      CRU COLUMN SCAN ADDRESS
       LDCR R1,3           TELL CRU THIS

       LI   R12,>0006      CRU ROW SCAN
       STCR R3,B           GET THE BITS
       INV  R3             INVERT THEM (THEY COME BACK INVERTED)
       JEQ  SUBEX          IF THE ARE ALL RESET . . GET OUT . . NOTHING HAPPENED

       CLR  @HOR           CLEAR HORIZONTAL ACCUMULATOR
       CLR  @VER           CLEAR VERTICAL ACCUMULATOR

       TB   0              TEST BIT FOR FILE BUTTON
       JEQ  NEXT1          NOT PRESSED . . GO ON
       CI   R5,>0600       IS THIS JOYSTICK #1?
       JNE  NEXT0          NOPE. SET FOR FIRE #2
       SETO @FIRE1         SET FIRE #1
       JMP  NEXT1          SCAN JOYSTICK FIRE LINES
NEXT0  SETO @FIRE2         SET FIRE #2

NEXT1  TB   1              TEST BIT FOR DOWN
       JNE  NEXT2          NOPE . .
       A    @SPD,@VER      YUP . . ADD IN DOWN

NEXT2  TB   2              TEST BIT FOR UP
       JNE  NEXT3          NOPE . .
       A    @SPDN,@VER     YUP . . ADD IN UP

NEXT3  TB   3              TEST BIT FOR LEFT
       JNE  NEXT4          NOPE . .
       A    @SPDN,@HOR     YUP . . ADD IN LEFT

NEXT4  TB   4              TEST BIT FOR RIGHT
       JNE  NEXT5          NOPE . .
       A    @SPD,@HOR      YUP . . ADD IN RIGHT

NEXT5
       LI   R0,>0780       ADDRESS OF SPRITE MOTION TABLE IN VDP MEMORY
       A    R10,R0         ADD IN OFFSET
       ORI  R0,>4000       TELL THAT WE WANT TO SET WRITE ADDRESS
       SWPB R0             GET LOW BYTE
       MOVB R0,@VDPWA      FEED IT TO VDP
       SWPB R0             GET HIGH BYTE
       MOVB R0,@VDPWA      FEED IT TO VDP
       NOP                 WAIT FOR LAST STATEMENT TO BE "FINISHED"
       MOVB @HOR+1,@VDPWD  PASS THE HORIZONTAL VELOCITY
       NOP                   WAIT FOR THAT TO FINISH
       MOVB @VER+1,@VDPWD  PASS THE VERTICAL VELOCITY

SUBEX  RT                  AND RETURN

       END
```

Demonstration 1

```
100 CALL CLEAR :: CALL LINK("JOYSET",1,14,2):: CALL SPRITE(#1,42,16,81,81)
110 CALL POSITION(#1,X,Y):: IF X<10 OR X>182 THEN CALL LOCATE(#1,100,Y):: GOTO 1
10
120 IF Y<10 OR Y>248 THEN CALL LOCATE(#1,X,100):: GOTO 110
130 CALL LINK("FIRED1",F):: IF F THEN CALL CLEAR
140 CALL HCHAR(INT((X+3)/8)+1,INT((Y+3)/8)+1,42):: GOTO 110
```

Please turn to Page 28 for Demonstration 2 program

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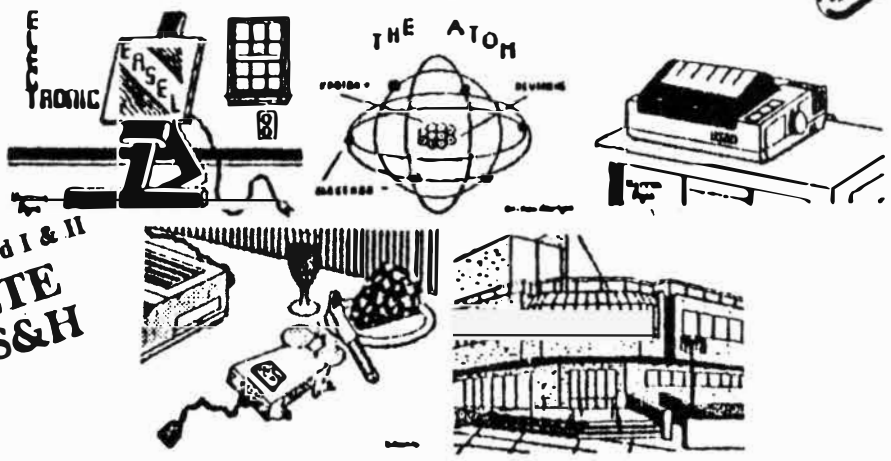

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Myarc to produce HD controller

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"Neat features" include DMA and an interrupt-based I/O.

He says price is expected to be "marginally more than a double-sided double-density disk controller."

He says release of the Geneve is waiting only on a chip from Mitsubishi and is expected to take place in late October.

He notes that owners of Myarc's XBII who have sent in floppies for their upgrade version 2.1 with a new EPROM and floppy. Myarc has now released version 2.1.1 which "takes care of a couple of bugs." He says users can mail in their disks for the new version, which he notes is a floppy upgrade only.

He says Myarc products will be on display at a computer fair in Cologne, West Germany, in late November.

For further information, contact Myarc, P.O. Box 140, Basking Ridge, NJ 07920 or (201) 766-1700.

Demonstration 2

```
100 CALL CLEAR :: CALL SCREEN(2):: CALL COLOR(14,14,1,3,16,1):: CALL CHAR(136,"0
0"&RPT$("7E",6),140,RPT$("183C3CFFFF3C3C18",4))
110 CALL CHAR(132,"183C3C7E7E8181"):: CALL MAGNIFY(3):: FOR Z=4 TO 22 STEP 2 ::
S=10+10*RND :: IF RND).5 THEN S=-S
120 CALL SPRITE(#Z,140,13*RND+3,Z*9-25,1,0,S,#Z+1,140,13*RND+3,Z*9-25,128,0,S)::
 NEXT Z
130 C=49 :: RESTORE :: FOR Z=1 TO 4 :: READ X,Y :: FOR W=0 TO 2 :: CALL HCHAR(X+
W,Y,136,3):: NEXT W :: CALL HCHAR(X+1,Y+1,C):: C=C+1 :: NEXT Z
140 ON ERROR 210 :: CALL SPRITE(#1,132,16,1,100):: C=49
150 CALL LOAD(-31878,24):: CALL LINK("JOYSET",1,20,2)
160 CALL COINC(ALL,H):: IF H THEN 200 ELSE CALL LINK("FIRED1",H):: IF H=0 THEN 1
60
170 CALL POSITION(#1,X,Y):: X=INT(X/8)+1 :: Y=INT(Y/8)+1 :: CALL GCHAR(X,Y,H)::
IF H()C THEN 160
180 C=C+1 :: FOR W=X-1 TO X+1 :: CALL HCHAR(W,Y-1,32,3):: NEXT W :: IF C()53 THE
N 160
190 DISPLAY AT(10,5)BEEP ERASE ALL:"You Win." :: CALL LINK("JOYSET",0):: END
200 CALL LINK("JOYSET",0):: CALL LOAD(-31878,0):: GOTO 130
210 ON ERROR 210 :: RETURN 160
220 DATA 5,5,5,25,16,5,16,25
```


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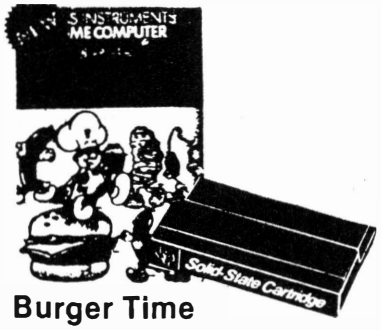

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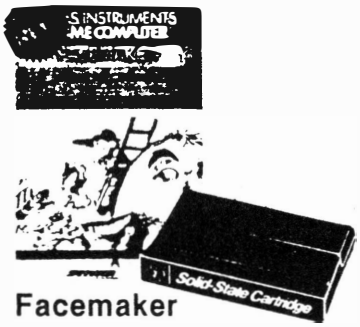

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Survey details Freeware attitudes

By JIM SWEDLOW

As a Freeware author, I have been curious to know about the experiences of others in this category. Recently I sent out a survey to the 42 Freeware authors listed in the then-current MICROpendium; 32 (75 percent) responded, representing a cross section of Freeware offerings.

In the survey form I asked for responses on a scale of 1 to 5. Thus, if 1 represents "very dissatisfied" then 2 is "dissatisfied" and if 5 is "very satisfied" then 4 is "satisfied." Hence, a response of 4 or 5 would be satisfied and 1 or 2 would be dissatisfied.

In the discussion of product distribution, the number of products is higher than the number of responses as some authors had more than one item.

The average item has been out 10.2 months or a median of eight months. It has been shipped to an average of 99.6 persons or a median of 56. Eight programs (20 percent) had 100-199 copies sent and seven (17 percent) had 200 or more. The remainder (63 percent) were requested fewer than 100 times.

Authors averaged 2.5 hours per week sending out their product.

and "no amount specified" (28 percent). Authors reported getting some response 82 percent of the time. The average number of responses was 31.4 (the median was 10).

They strongly opposed the name "Freeware" with 86 percent finding it misleading. "Fairware was the favorite:

Fairware	48 percent
Tryware	13 percent
Shareware	14 percent
Freeware	10 percent
Other	14 percent

The "Other" suggestions were Userware, Econoware, PaymentOptionalWare and Trustware. The name Tryware included Try&BuyWare.

Opinions regarding the role of users groups were:

Approach	Support	Oppose
Users group collects fee only for users group costs	69%	27%
Users group collects fee for author and sends to author	26%	52%
Users group financially supports authors some other (unspecified) way	52%	44%

ADVERTISING FREEWARE

Method	Effective	Ineffective	Number Using
MICROpendium	83%	8%	36
Bulletin boards	0%	86%	14
Letters to users groups	0%	89%	9
Users group announcements	25%	60%	20
Compuserve	25%	50%	8
The Source	0%	100%	1 (!)

The only effective method of advertising Freeware was MICROpendium, according to results shown in the accompanying chart.

Most authors (84 percent) asked for payment if the user was satisfied with the product. The amounts requested were: $5 (31 percent), $10 (41 percent)

Positions regarding what the user must pay for receiving a copy of the offering were:

User sends disk and postage-paid return mailer (not provided by author)	4%
User sends only cash—author always provides disk and mailer	4%
User sends cash OR disk and postage-paid mailer	32%
User sends cash OR disk, postage-paid return mailer and cash	61%

Generally, they felt that when the author provides the disk and mailer the fee should be in the $5-$10 range and when the user provides the disk and mailer the fee should be $2 to $7 (if any).

Fairware authors were evenly divided on the question of the workability of "get now—pay later." By a 56 percent to 44 percent margin, they said it can work. Regarding the various systems, they said:

No later fee requested	7%
Payment requested if user likes the program	52%
User becomes registered owner if payment is sent and then gets documentation and/or notices of updates and/or support	30%
Payment must be "up front" or before shipment	11%

This is what they thought was important about Freeware:

Item	Important	Unimportant
Sharing their program with others	90%	7%
Supporting the 4A	87%	0%
Communicating with other owners	65%	16%
Money	23%	48%
Recognition	27%	57%
Receiving programs with orders	30%	43%

They rated their satisfaction with their participation as follows:

Item	Happy	Unhappy
Response to their offer	48%	19%
Communication with other owners	61%	13%
Net profit	27%	37%

(Please turn to Page 32)

Freeware Update

Described below are recent additions to the MICROpendium Freeware listing. Freeware is user-supported software, and MICROpendium takes no responsibility for the effectiveness or usefulness of any Freeware item. MICROpendium encourages contributions to Freeware authors as an incentive to provide additional software support for the TI community.

Unless otherwise noted, always send a self-addressed, stamped return mailer and required media when ordering Freeware. Allow 4-6 weeks for delivery. Anyone with a problem regarding a Freeware transaction is encouraged to contact MICROpendium.

PROGRAMS FOR TESTING

Charles E. Kurzhal, of 7361 MUNSS Box 1013, APO NY 09145, is offering a three-program package for creating, managing, printing and taking user-written tests. Included is a TI-Writer file of instructions and a short sample test. Send 1 SSSD diskette, etc. For $9.50 the author will supply the diskette and return mailer.

ACCOUNTING, FORTUNE TELLING

Leo W. Du Bry, of 325 S. Center, Longview, TX 75601, is offering two programs: Accounting and George Tells a Fortune. Both require Extended BASIC and a printer.

The accounting program features a 16-column worksheet and allows for use with up to four bank accounts. User inputs column titles, enters check numbers, business names and amounts. Printout provides details on transactions. Data is saved to disk for future use. George Tells a Fortune displays a series of playing cards on the screen and prints explanations of their meaning on a printer.

SONGS, VCR MOVIE GUIDE

Bill Knecht, of 815 Yorkshire, Pasadena, TX 77503, is offering his Best Songs 2 and VCR Movie Guide as Freeware.

Best Songs 2 requires XBASIC and a memory expansion. Included are 12 songs with graphics and sing-a-long words. Titles include I'll Never Fall in Love Again, Bridge Over Troubled Waters and How Firm a Foundation.

VCR Movie Guide is used to catalog a movie collection. Inputs include title, rating, playing time, tape number, tape counter number. The program can handle up to 175 movie entries per file with area for nine files. Searches are conducted on basis of a keyword in the title or by rating. Display modes include fast scan of all entries, slow scan or scan and abort. Catalog lists may also be printed.

To order, send $5 for each program or $8 for both.

THE DOORS TO EDEN

L. Steven Cheairs, P.O. Box 27547, Albuquerque, NM 87125, is offering two adventure games: The Doors to Eden and First Days in Eden. The TI Adventure module is required. Both games function like a Scott Adams adventure.

The Doors To Eden involves a player who wanders about

(Please turn to Page 32)

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Most authors would do it again

By JIM SWEDLOW

With some freeware authors withdrawing their product in disgust and others expressing happiness, it was difficult to tell what was happening with freeware.

I decided to do a survey. I contacted 42 authors—everyone listed in the then current issue of MICROpendium and a few others. More than 75 percent responded. What they had to say bears directly on the future of the 99/4A!

While 47 percent of the authors were happy with their overall participation in freeware, a resounding 81 percent would still have released their program even if they knew what would happen. MICROpendium was the only effective method of publicizing freeware.

Some 84 percent of freeware authors

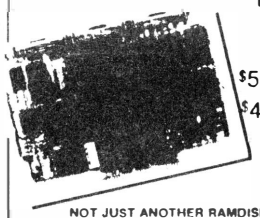
(Please turn to Page 33)

UPDATE—

(Continued from Page 31)

looking for clues to solve the adventure. The setting is a large desert. Upon completing the game an access code is given that is used to play the second game, First Days in Eden. This second game allows no movement and is set in a garden in which the player holds a "conversation" with a man. The man questions the player about the first game and, when he is convinced that the player fully explored and solved The Doors to Eden, the player receives another access code that is used to start a third game called The Garden of Eden Reclaimed. The third game has yet to be released.

The author asks for a $2 donation at the time the games are ordered. Send either two disks or two cassettes with stamped return mailer.



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THE ONLY RAM CARD YOU CAN BUILD yourself at substantial savings over fully constructed models. You can buy the printed circuit board, users manual, Operating System software, and an ILLUSTRATED step-by-step construction manual with schematic and parts list and get the parts wherever you can find the best deals. Hundreds of TI Enthusiasts have built the Horizon RAMDISK. If you've had any experience building electronic kits you can too -- at SIGNIFICANT SAVINGS! (If you want a fully constructed, tested and warranted unit, we sell those too.)

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- Comes with complete DSR SOURCE CODE. Explains how to write A/L CALL routines to enhance TI BASIC

HORIZON COMPUTER LIMITED

P.O. Box 554

Walbridge, Ohio 43465

SPRINT UTILITY

Ken Houle, of 27721 W. Wakefield Rd., Saugus, CA 91350, is offering SPRINT as Freeware. The program is a utility for assembly language programmers. It reads the variable 80 source file created by the Editor/Assembler editor and will dump it to a printer or disk. Payment of some sort would be appreciated, Houle notes.

FUNPLUS!

Jack Sughrue, Box 459, E. Douglas, MA 01516, is offering a disk of templates, utilities, tutorials, reviews and programs that allow users to access some of the power within the Funlwriter- DM1000 structure. Called FUNPLUS!, the disk includes an active cataloguer that allows printing, deletion, loading, etc.; a banner program, desk calendar, labelmaker, presentation program, templates for borders, boxes, letterheads, etc., transliteration codes for use with TI-Writer and quick reference charts. Also included is version 2.3 of DM1000. Memory expansion is required.

Sughrue asks for $8. He will provide postage, mailer and media.

BACKYARD POND

Dave Dalton, of 920 Hillview Dr., Marion, IA 52302, is offering a game for children called Backyard Pond. The object is to adopt the identity of a fish and survive against other fish. Send disk and stamped return mailer.

PRINTOUT

Steven D. Mehr, of 633 Hollyburne Lane, Thousand Oaks, CA 91360, is offering an XBASIC utility that provides a variety of options for printing display variable 80 files to Epson or Gemini compatible printers.

The program features normal, emphasized, double-strike or condensed printing, the ability to alter line spacing, the ability to print text or graphics files, printing of multiple copies or files, printing of D/V 80 or D/F 80 files, optional form feeds between files and a disk catalog option.

Mehr is asking for a $5 donation for his program. Include a disk and return mailer and postage.

FREEWARE—

(Continued from Page 32)

asked for a contribution if the user liked the program. In this sense, freeware is unique to the computer world. It allows the user to get software and to evaluate it before purchasing it. It also allows, in fact encourages, users to make free copies for other potential customers. The risk is borne completely by the person marketing the software.

The responses pointed to some changes that could improve freeware.

First is the name Freeware. There is strong support among authors for a change. Not only can it be misleading, but it is trademarked by Andrew Fluegelman, author of PC TALK (for the IBM). While many alternate names were suggested, the clear favorite of authors is Fairware.

If there was one area that generated more discussion than any other, it was the role played by users groups. Many authors believe that users groups can play a much stronger role in supporting fairware and our computer.

TI discontinued the 4A three years ago. We can take pride that not only are we still a viable member of the computer fraternity but that we have better products today than were available in 1983. Any set of comparisons would have glaring omissions but the difference between Disk Managers II, 1000 and IV tells the tale.

Our success is the result of the dedication and support of publications, vendors, commercial soft/hardware producers, fairware authors, user groups and, last but certainly not least, owners.

If we are to continue to be this strong on the fifth anniversary of Black Friday, user groups must reconsider their priorities. Although the following points deal with fairware, they apply to all the elements of the 4A's survival network.

It simply is not enough for user groups to distribute fairware and public domain programs through their libraries. It is worrisome that fairware authors report that programs and announcements sent to user groups resulted in absolutely no response.

There are many things that user group can do to help ensure that fairware is supported. Some suggestions are: member education, fairware reviews in newsletters, publicizing new offerings and direct support of fairware authors.

Some user groups are doing innovative things to support the 4A. Others are considering new ideas. If we share our ideas, our successes and our problems, we can help encourage others to act. This can be accomplished by articles in newsletters and letters to MICROpendium and other 4A publications.

It is not fairware that is at stake here, it is our 99/4As. We have done quite well in the last three years without any concerted effort. If we want this to continue, we must start planning and acting, starting now!

SURVEY—

(Continued from Page 30)

Overall reaction to participation	47%	20%

Given all this, a resounding 82 percent would still have released their program now even knowing what was going to happen.

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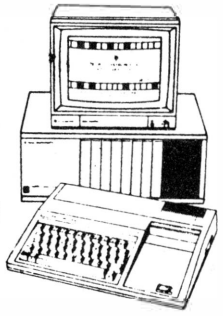

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Cryptography and the TI

First Serial Rights (C) 1986 Sean Sands

By SEAN SANDS

Codes, or ciphers as they are sometimes called, have been in use since early biblical times. Even as kids, each of us had at least a little experience with codes. Naturally, as soon as the first military computers came upon the scene they were immediately used to help in the encoding/decoding process.

The first of these early machines, the Hagelin cryptograph, used rotors inside that turned as the plaintext (message to be encoded) was entered. When the first rotor completed one revolution, the next would click one position, clicking the next rotor forward one after it made one revolution, changing the code each time. These rotors work about the same way as an odometer; after the one's position makes a full revolution it adds one to the ten's, and so on.

The Hagelin machine turned out a polyalphabetic mixed alphabet cipher that would repeat its pattern of coding every 100 million characters! Although the length of the pattern made it difficult to crack, it wasn't impossible. Portions of the key system would overlap at times, giving the cryptographer a clue of the machine's rotor settings.

Soon, though, rotors gave way to electric motors, then to things called stepping switches. Although many of the code computers used today are specially designed for codes, the TI, with its powerful string manipulation commands, can produce some pretty interesting ciphers.

Some of the functions we will be using are described below:

FUNCTION	DESCRIPTION
ASC(char.)	Returns the ASCII code of the character given.
CHR$(number)	Returns the character corresponding to the ASCII code given.
LEN(string)	Returns the length of the string given.
SEG$(string,position,length)	Extracts one string from a larger one. You specify the larger string, where to start extracting, and how many characters to extract from the starting point.

We'll start with the basics, with one of the first "codes" you may have used as a child—printing the message backwards. Type in subroutine No. 1 and we can go through the simple algorithm (a procedure that a program uses to solve a problem) that controls this subroutine. (The subroutines may be found at the end of this article—Ed.)

Variables: A$ = Plaintext (contains code upon return).

LINE NO.	EXPLANATION
10000	Initiates a loop that will count backward from the LENgth of A$ (the plaintext) to one. :: Takes the next letter out of A$ (counting backwards, remember) and adds it to B$, processing forwards. :: NEXT I :: Replaces A$ with reversed plaintext. :: Nulls B$. :: Returns

The subroutine is very simple, as is the code. Now key in subroutine No. 2 and we'll take it a step further. Pretend that each letter is assigned to a number (in BASIC that is relatively easy, because they are). The next code you may have tried as a kid (we're at about fifth or sixth grade now) would be adding or subtracting a number from the plaintext. The number you add or subtract is known as the deviation.

So, in designing the routine, I had to take some things into consideration. First, if the code drops below "A" I would want it to "wrap around" and finish subtracting from "Z." The same goes for anything above "Z," it has to continue adding at "A."

Two simple formulas can accomplish this: C=64+((C+D)-90) and C=91-(65-(C+D)); where C equals the ASCII code for the letter being processed and D equals the amount of deviation specified.

In addition to that, I want the subroutine to ignore spaces in the plaintext, to keep the groupings intact. Now let's take a look at the routine:

Variables: A$ = Plaintext (contains code upon return),
D = Deviation (A negative value subtracts, a positive adds)

LINE NO.	EXPLANATION
10500	Open loop. From one to the LENgth of the plaintext. :: C=the ASCII value of the character being processed.
10510	Checks if C+D exceeds "Z." If it does, it will wrap around and add to "A." If there is a space, then it keeps the space intact. Checks for a value lower than "A," and will wrap around if necessary. If none of the above conditions apply, it will simply add the deviation.
10520	Adds CHR$(C) to B$. :: NEXT I :: A$ = B$ :: B$ = "" :: RETURN

Of course, with a simple deviation code such as the one above, all someone would have to do to break the code is raise or lower the plaintext until he finds the right number. In the game of espionage, that's not very good. To ensure the secrecy of our messages, therefore, we must implement a

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CRYPTOGRAPHY—

(Continued from Page 34)

new code. This is where ADC comes in. Alternating Deviation Code has the unique quality of a deviation that alternates between addition and subtraction on every character. In other words, if the deviation is five, the first character would have a five added to it and the next would have a five subtracted from it.

The first problem that comes to mind when designing a subroutine to do this is how to switch from a positive deviation to a negative one repeatedly without having to write a lengthy switching routine. Type in subroutine No. 3 and let's examine the answer.

Actually, the solution is very simple. All one needs to do is insert a small formula just before the "NEXT I," like this: D = D*-1. For those who don't remember much of algebra (or math in general), a negative times a negative is a positive, and a positive times a negative is a negative. Because of this mysterious mathematical relation, every time the loop passes over this calculation the deviation will be turned into its inverse.

However, after some use, another problem becomes evident. If the subroutine encounters a space, it will alternate (or invert) the deviation as if there was a character there. So here is what would happen:

Normal encoding:

Plaintext: TI COMPUTER

ADC(1): UH DNNOVSFQ

Encoding with error in subroutine:

Plaintext: TI COMPUTER

ADC(1): UH BPLQTUDS

But the solution to this is again, simple. After "IF C = 32 THEN C = 32" we just add "D = D = D*-1". This will result in the deviation being inverted twice, returning to the original (no alternation). Here's what it looks like:

Variables: A$ = Plaintext (contains code upon return), D = Deviation (A negative value starts the loop subtracting, a positive adding.)

LINE NO.	EXPLANATION
11000	No change.
11010	IF C = 32 THEN C = 32::D = D = *D*-1 ELSE (...)*
11020	*Adds CHR$(C) to B$. :: Multiplies D to -1, resulting in the inverse of the deviation :: NEXT I :: A$* = B$ :: B$ = "" :: RETURN

As you can see, not much change is required to the regular deviation subroutine to produce ADC. That little change, however, produces a much safer code. But not that safe. To throw anyone who may intercept our messages even farther off track, we will implement ATDC; Alternating Triplicating Deviation Code. When coding ATDC, you must code in groups of three, in this format.

Character 1: Deviation

Character 2: No deviation

Character 3: Deviation * -1

To do this, we must make some bigger changes to the routine. First, the loop must be changed to increment in twos, allowing us to take one character, deviate it, and leave the second alone. Then we take the second group of two, deviate the first character with the inverse deviation, and leave the next alone. Here is what the subroutine will do:

Plaintext: COMPUTER

Two at a time: CO MP UT ER

Take the first two: CO

Add deviation(+1): DO (second character is left alone)

Take next two: MP

Add deviation(now -1): LP (Leave second character alone)

After it's all over: DOLPVTDR

But what if the length of the plaintext is an odd number? The loop wouldn't function properly. To fix this the first line will check if it is an odd or even length. If it is odd it will add a space to it to make it even. Type in subroutine No. 4 and we'll see how it works:

Variables: A$ = Plaintext(coded on return), D = Deviation

LINE NO.	EXPLANATION
11500	Checks to see if A$ is of an even length [IF LEN(A$)/2 = INT(LEN(A$))/2 THEN]. If it is, it continues; otherwise it adds a space.
11510	C2 = the character after the one specified by the loop.
11520	No change.
11530	Compiles B$, adding CHR$(C) to it leaving that "middle" character alone. :: The rest is unchanged.

I hope this article has been informative. Cryptography is a growing science, since one of the key parts of a nation's defense is knowing what the other side is up to. So, I will leave you with a message, a place to send away for more information on codes. This is a tough code, and when you reply, you must send the decoded word at the start of the message. Numbers were not encoded and should not be included in the decoding process.

TCE VMB DOK TGX

NSI VNI VZH
94 ZKD MYZ OVV ZIJ IN
XMI LJO NVI DFC OMD I
02852
30

(Please turn to Page 36)

Chicago, Milwaukee host fairs

Chicago's fourth annual TI Faire—the one which sparked many similar festivals all over the country—will be held Nov. 1 at Triton College in River Grove, Illinois.

The Faire will be held from 9 a.m. to 6 p.m. in the Ironwood Room of Triton's Student Center. Triton is at 2200 N. 5th Ave. in River Grove, ¼ mile north of Maywood Park race track.

Demonstrations by Clint Pulley, author of "C"; by Chris Bobbitt of Asgard Software; and by Lou Phillips of Myarc Hardware are scheduled.

Also scheduled are presentations by Al Stump on care and maintenance of the TI, and by J. Peter Hoddie on making music on the TI.

More than 20 vendors have signed up for the Faire, organizers say.

Admission is $2 and includes admission to seminars.

For more information Call Grant Schmalgemeir (312) 477-0690 between 10 and 11:30 p.m. Central Time.

Wisconsin Fair set

A Wisconsin TI Fair in the greater Milwaukee area is scheduled to be held Nov. 2, back-to-back with the Chicago TI-Faire set for Nov. 1.

The Wisconsin Fair will be from 8 a.m. to 4 p.m. at Milwaukee Area Technical College's South Campus, 6885 So. Howell Ave., Oak Creek, Wisconsin and is sponsored by the Wisconsin TI99/4A and the Milwaukee Area TI99/4A users groups.

Fair organizers say vendors, seminars and guest speakers are scheduled.

Admission is $2, $1 to users group members.

For further information call (414) 535-0133.

PC PURSUIT to give special offer at Faire

PC PURSUIT will have a booth at the TI Faire in Chicago Nov. 1 with a special offer to Faire-goers waiving the $25 sign-up fee, according to Rory Binkerd, of the Siouxland 99ers of Sioux Falls, South Dakota.

Binkerd and Bob Daggitt of the Siouxland 99ers will represent the service at the Faire.

PC PURSUIT is a service by GTE Teenet Communications Corp. which lets home computer users pay a signup fee and a set $25 monthly fee for any number of calls to databases and electronic bulletin boards in specified metropolitan fees during non-prime-time hours, 6 p.m. to 7 a.m. on weekdays and all day on weekends and most holidays. If the service is used during prime time it can cost between $10.50 and $14 an hour extra. PC PURSUIT charges are billed to MasterCard or VISA.

The service makes use of the excess capacity of GTE Telenet's data network which provides daytime commercial database access for business.

For further information, call 1-800-368-4215 8 a.m.-5 p.m. Eastern Standard Time Monday through Friday. Binkerd asks that callers mention him.

Fox UG address

The Fox City Users Group, of Appleton, Wisconsin, changed its mailing address two years ago but confusion remains.

Those who correspond should send their materials to P.O. Box 2553, Appleton, WI 54913-2553.

CRYPTOGRAPHY—

(Continued from Page 35)

Subroutine No. 1: String Reversal

```
10000 FOR I=LEN(A$)TO 1 STEP-
1 :: B$=B$&SEG$(A$,I,1):: NEX
T I :: A$=B$ :: B$="" :: RETU
RN
```

Subroutine No. 2: String Deviation

```
10500 FOR I=1 TO LEN(A$):: C=
ASC(SEG$(A$,I,1))
10510 IF C+D>90 THEN C=64+((C
+D)-90)ELSE IF C=32 THEN C=32
 ELSE IF C+D<65 THEN =91-(65-
(C+D))ELSE C=C+D
10520 B$=B$&CHR$(C):: NEXT I
:: A$=B$ :: B$="" :: RETURN
```

Subroutine No. 3: Alternating Deviation Code

```
11000 FOR I=1 TO LEN(A$):: C=
ASC(SEG$(A$,I,1))
11010 IF C+D>90 THEN C=64+((C
+D)-90)ELSE IF C=32 THEN C=32
 :: D=D*-1 ELSE IF C+D<65 THE
N C=91-(65-(C+D))ELSE C=C+D
11020 B$=B$&CHR$(C):: D=D*-1
:: NEXT I :: A$=B$ :: B$="" :
: RETURN
```

Subroutine No. 4: Alternating Triplicating Deviation Code

```
11500 IF LEN(A$)/2<>INT(LEN(A
$)/2)THEN A$=A$&" "
11510 FOR I=1 TO LEN(A$)STEP+
2 :: C=ASC(SEG$(A$,I,1)):: C2
=ASC(SEG$(A$,I+1,1))
11520 IF C+D>90 THEN C=64+((C
+D)-90)ELSE IF C=32 THEN C=32
:: D=D*-1 ELSE IF C+D<65 THEN
C=91-(65-(C+D))ELSE C=C+D
11530 B$=B$&CHR$(C)&CHR$(C2)
:: D=D*-1 :: NEXT I :: A$=B$
:: B$="" :: RETURN
```


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TI-Forth Utilities

Helpful, useful and well done

By HOWARD H. ARNOLD

A large segment of the TI community indeed has tried TI-Forth. Many of us have become addicted and believe there is probably *no other* language—surely none better.

But many others have loaded the system disk, acquired from their user's group or from MICROpendium, and found learning so difficult that they have shortly abandoned the venture.

Here's help.

Mike DeFrank offers a package called TI Forth Utilities. At $19.95 it is priced just above the range of freeware. It comes with a nicely organized 15-page manual and two SS/SD disks. You can access the programs either through Editor/Assembler or through SUPERCART (described in June-July 1985 MICROpendium). I don't have a SUPERCART cartridge, so was able to test only the E/A version. Disk 1 contains the enhanced Forth system, loaded through Option 3 of the Editor/Assembler with the file name DSK1.FORTH. Disk 2, in addition to the SUPERCART version of the Forth system, contains speech, sound and floating point utilities.

The first thing you'll notice after loading the system is a neat TI Forth logo and a menu of load options, much shorter than the menu offered by the TI-Forth disk. This is because most of the options listed on the TI-Forth screen have already been loaded at startup! No more will you get that silly "?" when you type "n EDIT" only to find the editor hasn't been loaded. DeFrank has opted to load CODE, SYNONYMS, COPY, DUMP, TEXT, GRAPH1, GRAPH 2, GRAPH, FILE and BSAVE from a binary file immediately after booting the system. He has also provided a slightly modified version of PRINT and a much improved EDITOR, along with a number of "Misc. Words" (more later on these). In addition to the convenience of having these files already available, this method of loading them is much faster than loading from the screens. One example: it takes just three seconds to load the editor this way!

The default editor, loaded at power-up, is the 64-column version. This, like its TI ancestor, uses tiny characters so that a full Forth screen fits on the monitor. My color monitor isn't clean enough to prevent color smearing of these little characters, so it's almost impossible to read them. On page 2 of the manual, however, DeFrank gives us clear and explicit instructions on how to change this and other defaults. You may also need to change the expected number of drives in the system at this time. The manual indicates this default is "1" but the disk I received had a value of "2"—which happened to be right, in my case. (This is the only error of any kind I found in the manual. I did find the printing—photo-reduced dot matrix print, I believe—to be quite illegible in a few places. K, for example, often came out looking like a slightly smeared I. I actually had to list Screen 43 to find out what the word KILL was.)

You can also change the screen color at this juncture if that kind of option turns you on. I'm personally quite well satisfied with the white on blue default provided.

The editor, whether you choose the 64-column or 40-column version, has

(Please turn to Page 37)

Review

Report Card

Performance ..... A+
Ease of Use ..... A+
Documentation ..... B
Value ..... A
Final Grade ..... A

Cost: $19.95
Manufacturer: Mike DeFrank, 4374 NW 9th Ave., Pompano Beach FL 33064
Requirements: Editor/Assembler, 32K, disk drive

```
T I  F O R T H

F O R T H  U T I L I T I E S  I
Version 2.1 (C) 1986 by Mike De Frank
[64 Column Editor Loaded]      5102 Bytes

-DECOMPILER     -EDITOR64     -FLOAT2
-SCR/DUMP       -EDITOR40     -CRU
-DISASSEMBLR    -SOUND        -TRACE
-DECOMPILER2    -SPEECH       -ASSEMBLER

TI FORTH
-SCR/DUMP

Insure UTIL1 Disk is in Drive 1
then Press any Key to Continue.

Screen Dump Loaded. ok
2 SDUMP
```

TI FORTH UTILITIES—

(Continued from Page 37)

been much improved over its TI parent. Several of the editing keys have been reassigned to make more sense. For example, CLEAR now is used to escape from the editor instead of BACK, previously used. BACK now, with indisputable logic, moves you back one screen while in editing mode. PROC'd moves forward one screen. You may now even be able to remember most of the key assignments; but there's no real need, since CTRL 9 (always listed on the editing screen) provides a two-page HELP manual whenever you need to be reminded.

Some other helpful additions are a word tab feature, which moves the cursor to the next (or previous) Forth word on the screen and a reminder when leaving editor mode of which screens have been updated so you can be sure to FLUSH them if you wish. By the way, DeFrank has renamed FLUSH to SAVE—much more descriptive, and he says he "couldn't bear FLUSH." Other word changes include BYE for MON, GO for GOTOXY and KILL for EMPTY-BUFFERS. The old words still work too, however, so if you have them permanently emblazoned on your memory, no problem. There are a couple dozen more of these "Misc. Words" ranging from trivial renaming of existing functions to downright useful additions.

Powerful sound and speech capability is also provided by the TI-Forth Utilities package. And demonstrations of these, along with the source code used to generate the demos, are included. There are also some graphics and color demos with their source code. And a modest "windowing" capability is provided in bitmap mode.

One very useful feature is provided via SDUMP. This utility permits the monitor screen to be copied to an Epson compatible printer, either in single or double size. It came as quite a surprise to me when the copies came out with the top of the screen on my right rather than at the top of the paper. This way, a full 8½-by-11-inch page is neatly filled by a double-size screen image. This works in either text or graphics mode, opening up a whole range of possibilities, either within programs or as a means of storing information in the program generation process.

For the beginner, if nothing else were included in the package, these enhanced capabilities and user-friendliness would be a real bargain. But for somewhat more advanced programmers, some features are provided that are truly outstanding. Two decompilers are included. One of these permits entry of any Forth word in the form:

' WORD TR

and a complete listing of the word's definition is displayed on the screen, together with pertinent addresses. A companion capability, using the word TR2, permits decompilation AND disassembly of words containing machine code. And, finally, a disassembler is provided for disassembling machine code, given only the starting and stopping addresses. None of these utilities offers the option of dumping the disassembly to disk or printer, so they will necessarily be limited to use on rather short definitions or programs during manual debugging sessions, or to an examination of some foreign Forth program for which you don't have the source code.

Another feature, most likely to be of value to the more advanced user, is the inclusion of an enhanced floating point package. Many of the floating point routines have been rewritten in assembly code, so a considerable improvement in speed can be obtained. I made no attempt to benchmark these routines against the standard package, but I did try a 1000-calculation loop, entering and multiplying two floating point numbers. I found that the DeFrank package accomplished the loop in 14 seconds as compared to 19 seconds for the old version. In case you're about to abandon integer arithmetic for floating point, though, be advised that a similar loop for integers comes in at well under one second!

Still another enhancement provided will be of help to all categories of user. This is an improved and enlarged character set. Besides the lowercase characters already commonly available in other packages, several line graphics symbols have been added, to permit the professional-looking screens seen in some of the menus in this package and in the 40-column editor.

Perhaps I've had too much to say *about* TI Forth Utilities; if so, this is because it's almost impossible to say too much *for* this package. It provides a long-needed assist to both the beginner and the experienced user of Forth.

I find one aspect of the package of some concern, however. The enhancements are so useful that they should be included in the programs generated by every Forth program developer. The copyright notices would seem to imply that copying this material is forbidden, however. It would seem quite ridiculous to develop programs using the DeFrank floating point arithmatic, for example, and then have to revise them with the old-fashioned version before distributing to others. It appears I won't be able to make use of most of the material myself, therefore, since I intend to distribute my product to others as freeware or otherwise. This is a matter not peculiar to this package, but a real dilemma in the software community.

In any case, I highly recommend TI Forth Utilities for beginners and experienced users alike if their programming activities are confined to their own personal use.

Users seek input

L.I. Stevens of New Zealand writes that he and several TI99/4A users have a "loose" association and would welcome receiving mail from suppliers of TI products with "any updates etc."

For further information, contact Stevens at 92, Station Rd., Papatoetoe, Auckland, New Zealand.

CorComp Memory Plus

Manager is only shortcoming

By SCOTT DARLING

The CorComp Memory Plus card comes in four variations: 256K and 512K cards for the Peripheral Expansion Box, and 256K and 512K standalone units (SAU). (I used the 512K card for this review.) Two SAUs or one SAU and one P-Box card may be configured together. Two PEB cards won't work. The following cards were in use in my PEB while reviewing Memory Plus: Triple Tech, RS232, CorComp disk controller and Horizon 192K RAMdisk. Also, I used Miller Graphics' GRAM Kracker without any problems.

The Memory Plus card requires that the original 32K card be removed. The SAU operates with or without the 32K card. A 9-volt power supply is included for backing up the card or SAU memory. It should not be the sole source of a copy of the Memory Plus.

All units will operate at address >1000 or >1400. These are the only choices for addresses. At >1000 the unit may be named drive No. 1 through 5, or R. At >1400 the only choice is No. 6.

Performance: The card does everything the documentation says it is supposed to do. The power supply backup never crashed. I wrote 120 plus files on the card and used them every day. I was able to move and manipulate them successfully every time. Apparently, there were some glitches in the earlier cards. This problem seems to have been taken care of. The version of the PROM in this card is 2.42.

Under certain circumstances, the only disk manager that can be used is resident on the card. The command to access it from BASIC or Extended BASIC is CALL RMGR. This manager is the only sore point I have with the card. It has several drawbacks.

This manager is required for any memory configuration above 400 kilobytes. (This shouldn't be a problem for anyone using a Memory Plus with 512K of memory initialized as the equivalent of a DS/DD (1440-sector) diskette.

The reason this manager has to be used is that the card uses three sectors for information about the disk. Sector 0 is used for the disk name, sector 1 is reserved for the file directory, and sector 2 is reserved for the disk bit map. (Sector 0 is not large enough by itself to handle the card's expansion potential of 2048 sectors.)

While you may read a RAMdisk directory with any other manager, don't attempt to write to it using another disk manager if the card is expanded beyond 512K. However, the resident manager can access floppy disk drives as well as the RAMdisk and works well with the existing disk controller.

The resident manager is only 8K long, and I feel it doesn't measure up to recent developments in disk manager software. Although it functions flawlessly, it isn't as well designed as others. For example, with single files the user has to provide the name of a file on which to perform such activities as renaming, deleting, changing file protection or copying.

However, there are provisions for disk image and multiple file copying. Using multiple file copy, you are asked if you want to copy all files. If you answer "no," it reads the directory and prompts "Copy Y/N." It does this for each file heading, then goes back and does the actual copying. On screen is a reminder about which drive the card is accessing. You may also change the drive number using the manager or use a DELETE "SD.x", where x is the drive number.

The manager also has a RAMdisk test built into it, though it doesn't seem to work properly at address 1400. However, it functions properly at address >1000. Also, the R command doesn't work at >1400 because, if there were two cards available, the system wouldn't know which one to go after.

There is another resident function on the card—DELETE "LOWER". This provides a lowercase character set with descenders for use with a running BASIC or Extended BASIC program. You return to the original character set when in command mode.

Aside from my reservations regarding the disk manager, I also found that the CALL CAT("DSK3.") from GRAM Kracker doesn't function. CorComp plans to rectify this. Obviously, this would be of concern only to someone with GRAM Kracker.

Positive points include a resident manager that can access any drive, floppy or Ramdisk; and 480 kilobytes of RAMdisk memory. This is 80K more memory than is provided by the Myarc RAMdisk, the ballpark equivalent of a single-sided, single-density floppy.

Another noteworthy item is a switch with built-in remote pins that sort of write-protects the card before powering down. This is supposed to eliminate any power feedback glitches. To quote CorComp,it purpose is analogous to "opening the disk drive doors." I

(Please turn to Page 40)

Review

Report Card
Performance.....B
Ease of Use.....A
Documentation.....A
Value.....B
Final Grade.....B

Cost: $190-$280 depending on version
Manufacturer: CorComp Inc., 2211-G East Winston Rd., Anaheim, Ca. 92807 (714) 630-2903
Requirements: Console, disk system (available as standalone or PEB card)

Newsbytes

Trinity Systems sells speech processor

Trinity Systems of Pittsburgh, Pennsylvania, has released Yak-Man, a menu-driven speech processor.

According to David Butalla of Trinity Systems, Yak-Man says "anything you want, forwards, backwards, even in Pig Latin."

Yak-Man also spells, he says. The software is programmed to recite some Shakespeare and the entire Lord's Prayer as well as a "Yak Rap" and a computer jargon alphabet.

Users have a choice of 64 different voices for Yak-Man, according to the manufacturer.

The manufacturer says Yak-Man has four sound F-X functions and a speech database that allows the user to create and edit about 500 words of speech text. Yak-Man comes with documentation that can be read into the speech file and accessed online, Butalla says.

Yak-Man is available on tape for $14.95. The program requires a Speech Synthesizer and Terminal Emulator II. The manufacturer offers a Yak-Man demo tape for $5.95, $5 of which is refundable upon the purchase of Yak-Man.

For further information, contact Trinity Systems, 1022 Grandview Ave., Pittsburgh, PA 15237 or (412) 373-8782.

MEMORY PLUS—

(Continued from Page 39)

found that if I did this I did not lose any data. But when I didn't I would sometimes lose a byte or two in the files. And they would act very strangely. So I got into a habit of using this switch.

A big advantage of this card is its ability to work with the other RAMdisk cards, though I found that the Horizon RAMdisk seemed to have the most trouble. I placed it at address >1000 and the CorComp Memory Plus at >1400. Everything powered-up and ran fine. When I reversed the cards' addresses the system refused to power up. I finally set the Horizon at >1700. The system powered up, but I could not access the Horizon. I plan to explore this more.

Also, CorComp has promised several programs—including a word processor, spreadsheet and database—designed specifically for use with the Memory Plus. They are not ready for release, though the word processor is supposed to be available soon. CorComp notes that an improved resident manager is going to be available.

Ease of Use: The card is very simple to install and operate. There are only two major decisions to be made before operating the card: Which address to use and which drive number to assign it. After the card or SAU is installed it is treated exactly like a disk drive.

Documentation: The documentation is actually overdone. Besides describing the installation procedure, it includes a detailed section on how to read and write files. This is one subject that most users will not need any advice on. The manual also fully explains the manager functions.

Value: It is hard to place a value on a RAMdisk, as each brand has its own strengths and weaknesses. CorComp's Memory Plus is well-suited for programs that do a lot of disk-accessing—databases, bulletin boards, spreadsheets, GRAM Kracker files, Editor/Assembler and TI-Writer. Rapid assembling of assembly language programs, as well as downloading from bulletin boards and electronic information services are some of many applications for this card. And there is a roundabout way of print spooling by writing the file to the RAMdisk and then printing it from the RAMdisk later.

DOS reduces risk for buyers

Disk Only Software president Jeff Guide has announced an innovative marketing agreement with Horizon Computer Ltd. on the distribution of the Horizon RAM Disk Card (reviewed in July 1986 MICROpendium). A RAM disk is a device that emulates a floppy disk.

According to Guide, "No longer will you have to pay the full cost of a RAM disk kit in order to see if you really are able to build one." A number of programs are also included in the package, Guide said.

Guide says that users may purchase a step-by-step construction guide by Ron Gries for $4. "After you have studied the guide, you can order the rest," he said. Users may then purchase a users manual by D.R. Romer for $6 and a collection of user hints and ideas for $2. The board costs $53 (parts are extra. Cost of the parts have yet to be determined). Assembled versions are available for $165, single-sided, and $210, double-sided.

Guide says, "up until the time you actually start building the card, you may obtain a full merchandise credit by returning to us the documentation in sellable condition."

DOS has also announced the publishing of its fall-winter TI99/4A product catalog. To obtain a copy, call 1-800-446-4462 + 897335 at the tone or 301-369-1339 or write Disk Only Software, P.O. Box 244, Lorton, Virginia 22079. To order products, use the same telephone numbers and have credit card information ready, or order direct from DOS at P.O. Box 4170, Rockville, MD 20850.

Texaments releases Rapid Copy utility

Rapid Copy, described as "the only turbo copier specifically designed to take full advantage of the Myarc, CorComp and Texas Instruments disk con-

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Newsbytes

(Continued from Page 40)

troller cards," has been released by Texaments.

According to Steve Lamberti of Texaments, the program is fully menu driven and allows a multitude of copy and format options. Depending on system configuration, copy times range from 35 seconds for a single-sided single-density disk to one minute, 17 seconds for a double-sided double-density disk, he says. He says that on average Rapid Copy is six times faster than the disk copy functons of the Myarc, CorComp and DM1000 disk managers.

Rapid Copy is endorsed by Myarc Inc., Lamberti says, and a new modified version of their disk management software is included with the program which allows the user from within its utility option. Lamberti also says that with Rapid Copy, CorComp and TI disk controller owners have the option to format disks using different interlaces.

Rapid copy is available for $14.95 plus $1.50 shipping. System requirements are 32K memory expansion, disk drive system consisting of at least one floppy disk drive and either the Extended BASIC, Editor/Assembler or TI-Writer command module.

For further information, contact Texaments, 53 Center St., Patchogue, NY 11772 or (516)475-3480.

Ryte Data offers 'run time' GPL Linker

Ryte Data announces the release of a "run-time" version of GPL Linker by Monty Schmidt.

GPL Linker is designed to make graphics programming language programs available with 32K and a disk drive by creating program image files from GPL object codes. These files can then be using Option 5 Run Program File of the Editor/Assembler module.

The Linker sets up the upper 24K of expansion memory as blocks of GRAM (Graphics Ram) for use in GPL programs. These blocks can be specified when writing GPL routines for assembly. Linker then sets up a simulator within the 8K low memory to execute compressed or uncompressed object code generated by the GPL Assembler.

According to Bruce Ryan of Ryte Data, the Run Time Linker package is designed to allow TI owners to run new GPL programs currently available and demonstrate "the ease of programming allowed using the GPL Assembler."

The package includes an Extended BASIC loader, four demonstration files and the new "Convert" program by Heiner Martin. This program, Ryan says, converts TI BASIC to Microsoft BASIC or Mechatronic XBIIplus. He says Convert will also work to convert Microsoft BASIC to TI BASIC syntax automatically under program control.

Ryan says that Martin has placed Convert in the public domain and that Ryte Data is sending it free with RT Linker. Source files and documentation are on disk.

RT Linker is available for $10 plus $2 shipping from Ryte Data, 210 Mountain St. Haliburton, Ontario, Canada K0M 1S0.

Ryan notes that additional documentation for the GPL Assembler is now included with each package sold. The documentation includes more information on the FMT command and updates on information contained in the book *Intern*.

He says that Ryte Data is also taking orders for Mechatronics' 80-Column Display Unit.

For further information, contact Ryte Data at (705) 457-2774.

Thomson Software products available

Support is still available for programs which were published and marketed by Thomson Software (M & T Utilityware)

C. Case of Huntsville, Alabama, has purchased the rights to DISK + AID, MEMORY MANIPULATER and CREDIT CARD DATABASE and says he will provide support for all holders of singular-purchase original programs, including update support for the new version of DISK + *AID*.

He says the new version of DISK + AID includes support for RAMdisk and five drives (six available on request). Price is $20 new or $5 upgrade from earlier versions of DISK + AID. All three are available for the package of $30 ($15 for an upgrade of DISK + AID and a new MEMORY MANIPULATOR AND CREDIT CARD DATABASE).

For further information or to order, contact Case at P.O. Box 14130, Huntsville, AL 35815 or (205) 883-8348.

Hardware available from California firm

Hardware designed for use with the TI99/4A is available from All Electronics Corp. of Los Angeles, California.

Products available include a combination power supply and transformer, 48 key unencoded keyboard assembly, connectors, a sound and video modulator, a serial RS-232 Y cable, a dual cassette/computer cable, miniature toggle switches, ribbon cables, potentiometers and cooling fans.

For further information, contact All Electronics Corp., P.O. Box 20406, Los Angeles, CA 90006 or (213) 380-8000.

Asgard issues c99 programs

Asgard Software is scheduling the release of two programs written using c99. c99 is a language that was developed by Clint Pulley for the TI. The programs are High Gravity and Total Filer. High Gravity is priced at $14.95 and Total Filer is $24.95. The release date is Oct. 27.

High Gravity, by Tom Wible (a professional programmer with TRW),

(Please turn to Page 42)

User Notes

(Continued from Page 41)

puts you in command of a relief spacecraft sent to aid a space station trapped in a strange solar system. The planets in the system are thick as flies, and prevent anyone from leaving or entering the solar system to rescue the unfortunates in the space station. Your mission is to shoot a capsule of supplies to the stranded astronauts, and you only have ten capsules of supplies on hand. Worse yet, you can't guide the capsules through since they have no engines.

Asgard says the programs strengths are in its graphics and playability and in the accuracy of its simulation of the laws of gravity and motion of projectiles. It requires the Editor/Assembler module, 32K and a disk system.

Asgard describes Total Filer, by Warren Agee, as "the first and only database designed for text." The program is designed to keep track of files created with TI-Writer.

With Total Filer users can create a file-by-file index of all text files. The index can include multiple keyword references for quick searches, as well as several layers of description for each. Total Filer allows full wildcard capability, which means users may search for any string of characters or any combination of letters within user-specified limits. Total Filer includes utilities for creating a master listing of the index and for compressing the index to save space on index disks.

Total Filer requires Editor/Assembler, 32K and a disk system.

For more information or to order, contact Asgard Software at P.O. Box 10306, Rockville, MD 20850, (301) 345-2492.

MG to offer GK enhancments

Millers Graphics, 1475 W. Cypress Ave., San Dimas, CA 91773 (714-599-1431), is in the process of releasing an enhancement disk for use with its GRAM Kracker and a replacement PROM for use with CorComp's disk controller.

The enhancement disk will support a number of operations in Extended BASIC. Among them are the ability to list programs with user-defined line length, resequencing of all or part of a program and the output of the TRACE command to a designated device. Also supported will be the ability to copy, move or delete blocks of program lines.

New CALLs will include EA (to move directly to the Editor/Assembler; CALL PEEKG to peek GRAM and GROM addresses; CALL PEEKV to peek VDP memory; CALL POKEG to poke GRAM address; and CALL POKEV to poke VDP memory.

Other enhancements include additional support for Editor/Assembler, including repeating keys, erase key and formatting of a Myarc RAMdisk.

The price of $10 includes documentation and shipping.

The Millers Graphics PROM for the CorComp disk controller will support a wildcard disk drive designation using an asterisk as the operator. After a drive has been designated, the asterisk will continue to access it as a default drive number. The wildcard feature will operate out of TI-Writer, BASIC, Extended BASIC, Editor/Assembler, Multiplan and other software.

The PROM also will allow users to access the CorComp disk manager from BASIC. Several new CALLs are also supported. These include CALL LLR to link, load and run; CALL ILR to initialize, load and run; CALL LR to load and run; CALL RUN to run a program.

Price and availability of the PROM have yet to be determined. Contact Millers Graphics for more information.

After Hours BBS for sale at discount

The After Hours Bulletin Board System, written in 100 percent assembly language and described by the manufacturer as the fastest bulletin board operating on any home computer, is available commercially.

Ed Schaum, of the Bronx, New York, says he is selling the final version for $100. Advance copies are available for $50 (customized), including free "lifetime updates," Schaum says.

Schaum says he sent information to MICROpendium in response to the letter by Herman Mosakowski in the August issue, and is offering a discounted price of $25 to MICROpendium readers, which includes the lifetime updates.

Schaum says the BBS requires the user to load one file, and the program is in operation. He says, "It does not require the use of multiple diskettes or drives and requires no preliminary setup whatsoever."

He says the system uses the standard cable to connect the RS232 to the modem, with no special cables needed.

The board features including a user voting section, 14 independent message bases (expandable to as many as the user's disk controller can handle), recent caller list, chat mode, 300/1200 baud, multiple newsletters, automatic word wrap, split screen for sysop-important information on the current user on screen at all times while text rolls by, 40 column screen and instant sysop override of any user function, according to Schaum.

He says that Xmodem file transfer routines are included in the code but are currently inoperational "until the final bugs are worked out."

Requirements are a Hayes compatible modem, memory expansion, any brand of RS232 card, standard modem cable, the Editor/Assembler cartridge (or any other control program—e.g., Myarc's Disk Manager—providing a "Load and Run" option) and a telephone line.

He says, "To see the system in operation, call (212) 547-4210. If you would like more information about the system, feel free to yell for me when you call."

The system may be ordered from Ed Schaum, 1060 Arnow Ave., Bronx, NY 10469.

User Notes

Vary the length of program listings

Eugene VandenBoss, of Adrian, Michigan, provided the following program, which allows the user to determine the line length of program listings. The program is called LISTINGVAR.

To use LISTINGVAR, it is necessary to save the program you wish to list via LIST "DSKn. FILENAME". This creates a D/V 80 file that is read by LISTINGVAR. When LISTINGVAR is run, the user is prompted for a printer name (the default is PIO) and the disk drive number and filename of the LISTed program to be listed. The user then enters the line length (between 10 and 136) and the program does the rest.

The program listing below was done using LISTINGVAR.

Users may need to modify line 170, depending on the type of printer in use. As published, the program is designed for a Delta Star. For a Gemini printer, replace CHR$(15) in line 170 with CHR$(27);CHR$(66);CHR$(3). Also, replace CHR$(18) with CHR$(27);CHR$(66);CHR$(1) or (2), depending on whether you wish to use 10- or 12-characters per inch. (The printer name default may also be modified in line 120. Changes will also be required in lines 170 and 280.)

VandenBoss writes that he developed LISTINGVAR to solve a problem that occurred when using XLATE, which was published in a previous edition of MICROpendium.

The problem "is that of having the program decide when it is a new line or an extension of an old line. I tried several years ago to write such and gave up. The mistake I was making then was that I was looking at it as a prefix problem, which had only a few hundred cases. (Then) I came up with the thought that it might be a postfix problem. I still have not solved the problem, but this is much closer. LISTINGVAR will still fail if an extended line ends in the form: *number ! stuff*. But this type of form is not that common and could be replaced by: *number :: ! stuff*. I will not say that I have found all the postfixes, but LISTINGVAR works on all that I have tried it on."

```
100 !LISTINGVAR
110 DISPLAY AT(1,6)ERASE ALL
:"OUTPUTS LISTINGS WITH LENG
TH": :"      BETWEEN 10 AND 1
36"
120 DISPLAY AT(11,1):"PRINTE
R PIO"
130 ACCEPT AT(11,9)SIZE(-28)
:P$ :: DISPLAY AT(13,1):"DIS
K FILENAME DSK1.LIST" :: ACC
EPT AT(13,15)SIZE(-14):D$
140 DISPLAY AT(15,1):"WIDTH
10 TO 136 028" :: ACCEPT AT(
15,17)SIZE(-3):L
150 IF L>9 AND L<137 THEN 16
0 ELSE 140
160 OPEN #1:P$,VARIABLE L ::
 OPEN #2:D$,INPUT ,DISPLAY ,
VARIABLE 80
170 IF P$="PIO" THEN IF L>80
 THEN PRINT #1:CHR$(15)ELSE
PRINT #1:CHR$(18)
180 LINPUT #2:B$ :: A$=B$ ::
 IF EOF(2)THEN 280
190 LINPUT #2:B$ :: P1=POS(B
$," ",1):: IF P1<2 THEN 270
200 ON ERROR 300 :: V1=VAL(S
EG$(B$,1,P1))
210 IF SEG$(B$,P1+1,1)=" " T
HEN P1=P1+1 :: GOTO 210 ELSE
 P1=P1+1
220 IF P1>=LEN(B$)THEN 270
230 V1$=SEG$(B$,P1,4):: IF V
1$="THEN" OR V1$="ELSE" THEN
 270 ELSE V1$=SEG$(B$,P1,3):
: IF V1$="AND" THEN 270
240 V1$=SEG$(B$,P1,2):: IF V
1$="::" OR V1$="OR" OR V1$="
**" THEN 270
250 V1$=SEG$(B$,P1,1):: IF V
1$="+" OR V1$="*" OR V1$="^"
 OR V1$="-" OR V1$="/" OR V1
$=")" OR V1$="<" OR V1$=">"
OR V1$="=" THEN 270
260 PRINT #1:A$ :: A$=B$ ::
IF EOF(2)THEN 280 ELSE 190
270 A$=A$&B$ :: IF EOF(2)THE
N 280 ELSE 190
```

(Please turn to Page 44)

Night Mission score feature

The following comes from Kazco International, P.O. Box 44023, Sylmar, CA 91342:

Those of us smart enough to be owners of Miller Graphics' Night Mission already know it is educational, as well as entertaining. Its documentation alone is well worth the price. With this in mind, Kazco International in no way presumes our change is an improvement, but rather an addition. Even so, once you've keyed in this high score feature, we think you'll agree that it looks, sounds and acts as if it belongs there.

You must first change three existing lines in the game programs called NMJOY and NMKEY but make no changes to LOAD. Here are the lines, including changes:

```
10 CALL MAGNIFY(3):: CALL SCREEN(2):: GOTO 30 :: CALL KEY :: CALL JOYST :: CALL
SOUND :: CALL PEEK :: CALL HCHAR :: CALL VCHAR :: HS :: MAX
220 CALL COLOR(10,1,1):: DISPLAY AT(7,16):"" :: CALL CHAR(108,E$&"55000061E1FFFF
FF00000003"&E$&"5540E0F8E4E2E1F1FF7C45FE")
260 IF Z THEN B=B+Z*10000 :: GOTO 740 ELSE CALL CHAR(108,"FF81BFA0AFB981FFFF81E7
1818E781FFE7B5B5BDBDADADE7E7A5A5BDA5A5A5E7")
```

Next, you must add three entirely new lines to NMJOY and NMKEY:

```
272 DISPLAY AT(7,7):"o m l o" :: HS=MAX(HS,SC):: IF SC<HS THEN 278 ELSE CALL COL
OR(10,6,1):: DISPLAY AT(7,16):HS
274 FOR X=0 TO 27 STEP 3 :: CALL SOUND(-155,550,X,557,X):: DISPLAY AT(7,7):"" ::
 DISPLAY AT(7,7):"o m l o   "&STR$(HS):: CALL SOUND(-1,4E4,30):: NEXT X
278 CALL COLOR(10,6,1):: DISPLAY AT(7,16):HS
```

That's all there is to it. Remember to SAVE your altered program to a new disk (include LOAD) rather than to your original game disk. Kazco welcomes any comments on this change. Mail comments to the above address.

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```
280 PRINT #1:A$ :: IF P$="PI
O" THEN PRINT #1:CHR$(18)
290 CLOSE #1 :: CLOSE #2 ::
STOP
300 RETURN 270
310 END
```

Faking-out the formatter

Ralph J. Mineo, of Lakeside, Ohio, writes: "Want to fake out your TI-Writer formatter so that you don't have to reload it—and you won't have to write a separate file with .IF (Include File) commands? You can do it with only one line (and this comes in handy when you're dealing with a full disk and don't want to use two sectors for an .IF file.) Make the last line of your program: ".IF FAKEOUT!" Even if you have a file with that name, the formatter will "crash" and you can enter a new file without having to reload the formatter (since you "forgot" to put in "DSKn." before the file name. Maybe use the New Page command with it to get your second file on a clean page."

I/O buffer works for you

There's more than one way to send data to a printer, and some are faster than others. Jim Swedlow, of the Users Group of Orange County, Fountain Valley, California, published the following in the groups newsletter, ROM.

When you send data to your printer or to disk, your TI stores information in the input-output buffer. Generally, it will keep data until it sees the end of a record.

To illustrate, consider this program. It demonstrates the graphics abilities of Epson and compatible printers.

```
10 OPEN #1:"PIO.CR"
20 PRINT #1:CHR$(27);"L";CHR
$(127);CHR$(0)
30 FOR I=1 TO 127
40 PRINT #1:CHR$(I)
50 NEXT I
60 PRINT #1:CHR$(13)
70 CLOSE #1
```

Line 10 opens your printer and tells you 4A not to send a carriage return and a linefeed every 80 characters. Line 20 puts your printer in grpahics mode and tells it it expect 127 graphics characters. The loop in lines 30 through 50 send the entire range of graphics characters. Line 60 sends a carriage return to clear the printer's buffer.

Since there is no print separator after the CHR$(I) in line 40, each character is taken as a record and sent to the printer. If you added a semicolon after the CHR$(I), all 127 graphics codes would be held in the input-output buffer until line 60 is executed.

The difference is speed. Without the semicolon, it took about 10.2 seconds for this program to run. When the print separator is added, run-time dropped to 7.5 seconds.

Wordcount revised

Bob Mack, of Waynesboro, Georgia, submitted the following revision of the Wordcount program written by B. Davies. Wordcount was published in the April 1986 issue of MICROpendium. The program counts words in TI-Writer files.

This revision condenses the code and offers a fast and slow speed. The slow mode displays the line number, line text and a running word count at the bottom of the screen. The fast mode operates like the original, with the total appearing after the entire file has been processed.

```
100 ! WORDCOUNT BY B. DAVIES      (REVISED BY BOB MACK        7/22/86)
110 DIM B$(20)
120 E$=".IN.LM.BP.SP.TL.FI.FO.HE.IF.CE.AD.LS.ML.NA.NF.PA.PL.RM.CO.DP" :: FOR I=1
 TO 60 STEP 3 :: B$((I+2)/3)=SEG$(E$,I,3):: NEXT I :: E$=RPT$(" ",104)
130 W=0 :: DISPLAY AT(1,10)ERASE ALL:"WORDCOUNT" :: DISPLAY AT(5,2):"SELECT:  1
FAST MODE":"           2 SLOW MODE" :: ACCEPT AT(5,27)BEEP VALIDATE("12"):A$ :: I
F A$="1" THEN F=1 ELSE F=0
140 DISPLAY AT(5,1):E$ :: DISPLAY AT(5,2):"Enter Text File Name" :: DISPLAY AT(7
,7):"DSK" :: ACCEPT AT(7,10)SIZE(12):D$
150 ON ERROR 290
160 L=0 :: DISPLAY AT(12,1):"FILE INPUT IN PROGRESS..." :: IF F=0 THEN DISPLAY A
T(14,1):" Line Number:"
170 OPEN #1:"DSK"&D$,INPUT
180 LINPUT #1:A$ :: L=L+1 :: DISPLAY AT(14,19):E$ :: IF F=1 THEN 190 ELSE DISPLA
Y AT(14,18):L :: DISPLAY AT(15,1):E$ :: DISPLAY AT(15,1):A$
190 IF EOF(1)=1 THEN 270
200 IF A$="" THEN 180 :: Q=ASC(SEG$(A$,1,1)):: IF Q=27 OR Q=46 THEN 180 :: IF Q<
32 OR Q>126 THEN A$=SEG$(A$,2,LEN(A$)-1):: GOTO 190
210 FOR I=1 TO 20 :: IF POS(A$,B$(I),1)=1 THEN 180
220 NEXT I
230 FOR I=1 TO LEN(A$):: C=ASC(SEG$(A$,I,1)):: A=((C>64)*(C<91))+((C>96)*(C<123)
)+((C>47)*(C<58))+(C=39):: IF A=0 THEN 240 ELSE D=1 :: GOTO 250
240 IF D=0 THEN 250 ELSE W=W+1 :: D=0 :: IF F=1 THEN 250 ELSE GOSUB 300
250 NEXT I :: D=0 :: IF A=1 THEN 260 ELSE GOTO 180
260 W=W+1 :: IF F=1 THEN 180 ELSE GOSUB 300 :: GOTO 180
270 CLOSE #1 :: DISPLAY AT(19,1)BEEP:"There are about" :: DISPLAY AT(19,17):W ::
 DISPLAY AT(19,23):"words" :: DISPLAY AT(20,1):"in the Text File entered."
280 DISPLAY AT(22,1):"Another Text File? (Y/N)" :: ACCEPT AT(22,26)SIZE(1)VALIDA
TE("YN"):A$ :: IF A$="Y" THEN 130 ELSE STOP
290 CALL SCREEN(7):: DISPLAY AT(23,1)BEEP ERASE ALL:"DRIVE/FILE NAME ERROR" :: F
OR I=1 TO 500 :: NEXT I :: CALL SCREEN(8):: RETURN 140
300 DISPLAY AT(23,12):W :: RETURN
```

DM1000 too fast?

Version 3.1 of Disk Manager 1000 is a nifty program, but Louis Guion of the NET 99ers says it can be made even better by making a small modification. A problem he encountered is that when he holds a key down for a brief time it repeats several times. His suggestion is to slow down the repeat action.

First, copy the MGR1 file to a newly initialized disk. Then load a sector access program and go to sector 36 or have the program search for the following hex string:

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06 03 16 F9 03 80 00 A0 FF 00 C0 1D

The important bytes are 42 and 43, the 00A0 in the above string. Changing these bytes will modify the speed of the repeat action. The range of acceptable values falls between 00A0 and 07D0.

After making the change, save it and then copy the modified MGR1 file to your working copy of DM1000.

Keeping track of disk contents

This isn't a very elegant way of producing a master catalog of the programs on your diskettes, but it's cheap and easy and a good place to start, particularly if you have TI-Writer. The program runs in BASIC or Extended BASIC. There are features one can add with little trouble that could result in a very nice and cost-free way of maintaining your library of files and programs.

The whole idea of this program is to produce a disk catalog that is written to disk and that can be loaded into TI-Writer. With TI-Writer, the user should be able to load numerous disk catalogs into memory, save them and perhaps sort them using one of the various sort routines that are available. Outputting the finished product to a printer would provide an up-to-date catalog of one's program library. One may also find a way to use the outputted catalog files to be read by database program. TI-Writer can even be used for this purpose. The user simply enters the name of the program he is seeking using the Find String function.

We started with the disk catalog program from the manual that came with the TI disk controller. With slight modifications to a couple of lines (230, 240, 280, 310 and 340) and the addition of three new lines (212, 215 and 345) we set it up so that it would print the catalog to a disk drive and disk file named by the user. At this point, it can be used only by a user with at least two drives (a RAMdisk could possibly be used, also). The problem with a one drive setup is that it the program cannot write a catalog of a disk that is concurrently being read from and written to.

Here is what the program line additions do:

```
1 CALL CLEAR
40 REM FROM PAGE 43 OF DISC MEMORY MANUAL
110 DIM TYPES$(5)
120 TYPE$(1)="DIS/FIX"
130 TYPE$(2)="DIS/VAR"
140 TYPE$(3)="INT/FIX"
150 TYPE$(4)="INT/VAR"
160 TYPE$(5)="PROGRAM"
170 INPUT "MASTER DISK(1-3)? ";A
180 A=INT(A)
190 IF A<1 THEN 170
200 IF A>3 THEN 170
210 OPEN #1:"DSK"&STR$(A)&".",INPUT ,RELATIVE,INTERNAL
212 INPUT "Enter Drive No.and Filename for catalog: ":DN$
215 OPEN #2:DN$,OUTPUT,RELATIVE
220 INPUT #1:A$,J,J,K
230 PRINT #2:"DISK FILE CATALOG";"DSK.";" - DISKNAME= ";A$:"AVAILABLE=";K;" USED
=";J-K
240 PRINT #2:"FILENAME  SIZE  TYPE      P";"--------- ---- ---------- -";
250 FOR LOOP=1 TO 127
260 INPUT #1:A$,A,J,K
270 IF LEN(A$)=0 THEN 350
280 PRINT #2:TAB(1);A$;TAB(12);J;TAB(17);TYPE$(ABS(A));
290 IF ABS(A)=5 THEN 320
300 B$=" "&STR$(K)
310 PRINT #2:SEG$(B$,LEN(B$)-2,3);
320 IF A>0 THEN 340
330 PRINT #2:TAB(28);"Y";
340 PRINT #2:CHR$(13):: NEXT LOOP
345 CLOSE #2
350 CLOSE #1
360 END
```

212 asks for a drive number and filename for the output catalog file. The following format is expected: DSKx.FILENAME

215 opens the output file.

345 closes the output file.

The addition in line 340—CHR$(13)—is to print a carriage return after each catalog line. We did this because we expect most users will load a number of catalog files into memory using TI-Writer, and perhaps reformat them. This will prevent the lines from running together on reformatting. Also, the carriage returns may be of use if you resort the catalog files.

Most of the other changes are minor and were done to make the catalog file conform to the appearance of the catalog that the program normally outputs to the screen.

We can think of a number of improvements that can be done. Among them are a modification that would print the disk name next to each program or file. Readers who make improvements may wish to submit them as user notes for future publication.

CC Manager loads from program

CorComp's disk manager program is designed to load only from the power-up screen, which can be an inconvenience. However, it is possible to access it directly from a program, according to Randy Ainsworth, author of RAndY's RumOR RaG on the Source.

According to the Rag, the following three-line program is all that it takes:

```
100 CALL INIT
110 DELETE "LD-CMDS"
120 CALL LINK("MGR")
```

Ainsworth credits Lee Bendick for the program.

Repairs to TI products

We occasionally get requests for the address for repairs for TI99/4A products manufactured by Texas Instruments.

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User Notes

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Write Daymon Fikes, Texas Instruments, Attn.: Repair, 2305 N. University, Lubbock, TX 79415.

For repair information, call (806) 741-2321.

Users group changes meeting schedule

The San Fernando Valley 99 User Group has changed its meeting date to 7:30 p.m. the second Wednesday of each month.

The group meets in the Doctor's Conference Room, Sherman Oaks Community Hospital, 4929 Van Nuys Blvd., Sherman Oaks, California.

For further information, write SFV99ers, P.O. Box 1844, Canyon Country, CA 91351 or call (818) 507-6219 or (805) 255-7583.

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